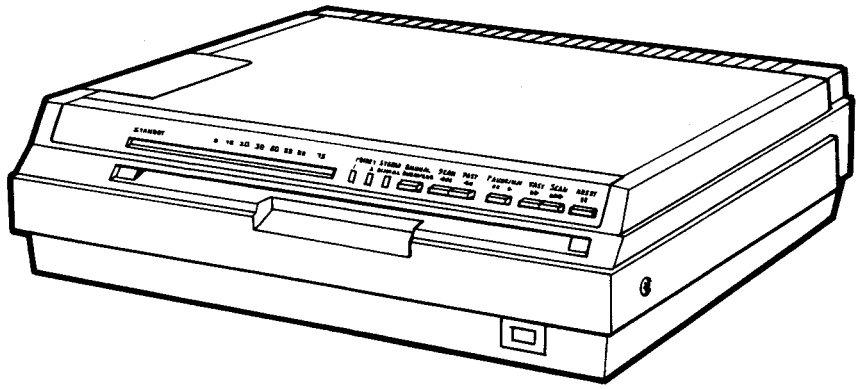
HITACHI
SERVICE MANUAL

YK | No.911E

VIP201P
VIP202P



CAUTION: Before servicing this chassis, it is important that the service technician read the "Safety Precaution" and "Product Safety Notices" in this service manual.

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SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO DISC PLAYER

August 1983 **YOKOHAMA WORKS**

PRODUCT SAFETY NOTICE

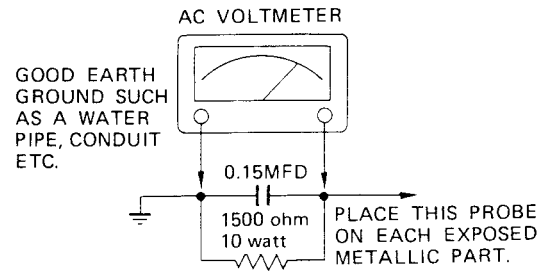
Many electrical and mechanical parts in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements: electrical components having such features are identified by a ⚠ mark in the schematic diagram and the parts list.
Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire or other hazards.

SAFETY PRECAUTIONS

WARNING: Service should not be attempted by anyone unfamiliar with the necessary precautions on this player. The following are the necessary precautions to be observed before servicing this chassis.

1. When replacing a chassis in the cabinet, always be certain that all the protective devices are put back in place, such as: non-metallic control knobs, insulating covers, shields, isolation resistor-capacitor network etc.
2. Before returning the set to the customer, always perform and AC leakage current check on the exposed metallic parts of the cabinet, such as antennas, terminals, screwheads, metal overlays, control shafts etc, to be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly into a 240V AC outlet (do not use a line isolation transformer during this check). Use an AC voltmeter having 5000 ohms per volt or more sensitivity in the following manner.

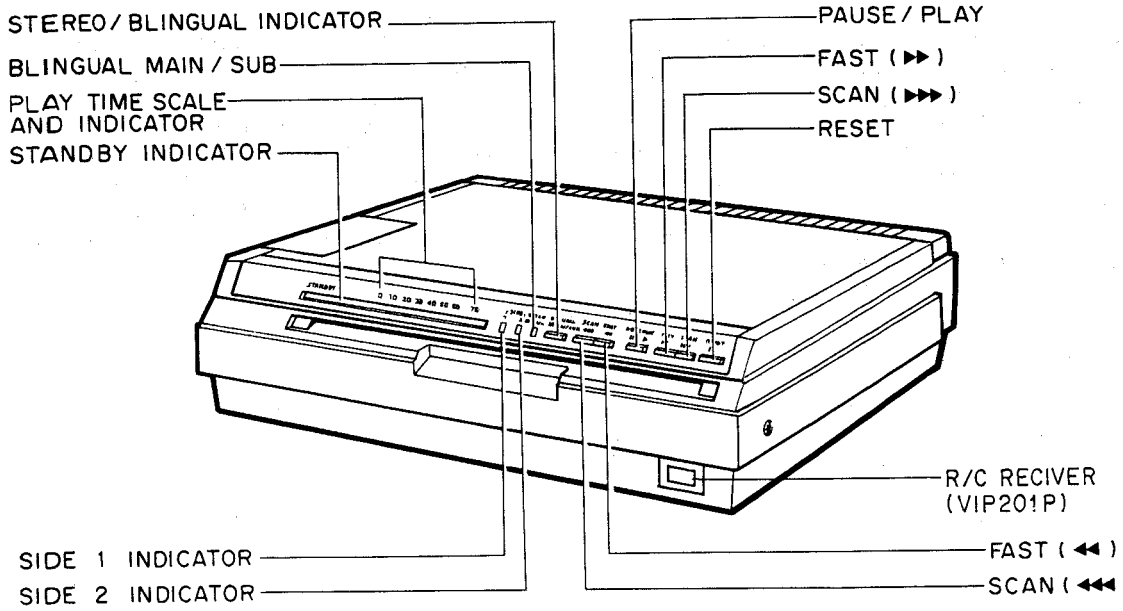
Connect a 1500 ohm 10 watt resistor, paralleled by a 0.15 mfd, AC type capacitor, between a known good earth ground (water pipe, conduit, etc.) and the exposed metallic parts, one at a time. Measure the AC voltage across the combination of 1500 ohm resistor and 0.15 mfd capacitor. Reverse the AC plug at the AC outlet and repeat AC voltage measurements for each exposed metallic part. Voltage measured must not exceed 0.3 volts RMS. This corresponds to 0.2 milliamp. AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.


AC VOLTMETER
GOOD EARTH GROUND SUCH AS A WATER PIPE, CONDUIT ETC.
0.15MFD
1500 ohm 10 watt
PLACE THIS PROBE ON EACH EXPOSED METALLIC PART.

SERVICE NOTES

1. When replacing parts or circuit boards, clamp the lead wires to terminals before soldering.
2. When replacing a high wattage resistor (oxide metal film resistor) on circuit board, keep the resistor 10 mm (1/2 in.) away from circuit board.
3. Keep wires away from high voltage or high temperature components.

FRONT CONTROLS VIEW



CHASSIS OUTLINE

1. STEREO CAPABILITY

VIP201P/VIP202P are newly developed in accordance with coming STEREO and INDEPENDENT (Dual) Sound Discs. Moreover this chassis incorporates noise reduction circuits which improve the sound quality by expanding its dynamic range up to 70dB for STEREO discs recorded with noise reduction.
A picture with stereo sound can be enjoyed thru TV, stereo amplifier and speakers.

All the discrimination between Discs [MONAURAL (MONO)/STEREO/INDEPENDENT (BILINGUAL or DUAL) and Normal/Noise Reduction Recording] is done by the newly developed microcomputer and the player automatically select the operation mode except for the MAIN/SUB changeover.
MAIN/SUB selection for INDEPENDENT discs is done by pushing the MAIN/SUB SELECTOR. The tables below show the sound output modes.

(1) SOUND OUTPUT FROM TV

DISC / AUDIO SELECTOR POSITION	MONAURAL DISC (MONO)	STEREO DISC	INDEPENDENT DISC
MAIN	MONO	MONO (L + R*)	MAIN
SUB	MONO	MONO (L + R*)	SUB

* Mono sound is mixed L and R with noise reduction.

(2) SOUND OUTPUT FROM AUX. OUT

DISC / AUDIO SELECTOR POSITION / AUX. OUTPUT	MONAURAL DISC		STEREO DISC		INDEPENDENT DISC	
	L	R	L	R	L	R
MAIN	MONO	MONO	L*	R*	MAIN	MAIN
SUB	MONO	MONO	L*	R*	SUB	SUB

2. FEATURES

(1) Fully automatic electro-mechanism enables to playback with a simplest operation, — just insert the disc caddy and then pull it out, leaving the disc in place — the rest is fully automatic.
(2) 4 Speed Visual Search function provides x120, x16, x4 times the normal speed and STEP (PAGE) on both foward and reverse directions.
(3) Built-in Stereo with CX-noise reduction circuit reproduces the hi-fi sound from CX-encoded Stereo Video Disc.
(4) Built-in Bilingual (Dual Sound) audio circuit provides either of 2-channel sound sources from Bilingual (Dual Sound) Disc.
(5) Infra-red Wireless Remote Control for VIP201P enables to operate as many as 11 functions.
(6) Wired Remote Control for VIP202P.
(7) The machine weights only 6 kg and is only 115 mm at hight. Thus, along with a front-loading mechanism, its compact design saves installation space.
(8) Most of the electronics circuits are integrated on a single circuit board, providing improved serviceability and reliability, as well as a reduced power consumption of 20 W.

SPECIFICATIONS

- Disc system: CED-ES (European Standard) MONO/STEREO/BILINGUAL (DUAL SOUND)
- Playback time
  : 75 min/side max.
  : 2.5 hr/both sides max.
- Output
  : RF-Output 32-40 ch (PAL-I) 74 dBμ
  : Video PAL Comosite .. 1 Vp-p/75 ohm
  : Audio R, L ..... 6 dBs/5 kohm
- S/N, Dynamic Range
  : Video S/N ..... 46 dB
  : Audio Dynamic Range . 70 dB (with CX)
- Visual Search
  : 4 speed ..... x120, x16, x4, STEP forward and reverse direction
- Power Consumption
  : 20 W ..... 240V/50 Hz
- Dimensions (W x H x D)
  : 424 x 115 x 420 mm
- Weight
  : 6 kg
- Remote Control
  : 11 Function ..... Infrared for VIP 201P
  : 11 Function ..... Wired for VIP 202P

OPERATION SEQUENCES

1. DISC INSERTION

(1) When the Disc (Caddy) is inserted thru the disc slot the door is depressed and the door switch is turned ON.

Note:
When servicing with the main P.W.B. lifted, please observe this sequence.

(2) Side indicator level is lifted up for side 1 play, (for side 2 the side indicator does not move) as the Disc (Caddy) is inserted.
(3) RF select lever is pushed for activating both RF switch and power switch (Power ON).
(4) Both STANDBY/PLAYTIME INDICATOR and SIDE INDICATOR will light.
(5) Then the Spine and the Disc are held by the caddy chuck. The side indicator, RF select lever and Power switch are locked in position.

2. DISC LOADING

(1) The door is closed and the door switch is ON.
(2) Loading (setting the Disc on the turntable) starts.
(3) When the Caddy Rail Assembly reaches its bottom position, the Loading operation is completed.
(4) The Caddy Rail Assembly keeps the door from opening as long as it is at the bottom position. Thus, another disc cannot be inserted during playback.

OPERATION SEQUENCES (CONTINUED)

3. LEAD-IN AND PLAY

(1) The pickup arm moves to the right, (PLAYTIME INDICATOR shows this movement) and stops at the lead-in point, which is determined by the lead-in switch (photo-coupler type on MAIN P.W.B.) and the lead-in shutter on PICKUP ARM.
(2) The stylus tip lowers temporarily onto the stylus cleaner and dust on the stylus tip is removed by the cleaner. ..... Figure 1.
(3) The stylus tip lowers at the lead-in point by detecting shutter sequence (off-on-off-on) switch lead-in SW and searches for the starting point of the program with the help of the Daxi code, then playback starts.
(4) Special effects are obtainable by the operation of the control buttons.
(5) The PICKUP ARM returns after play is completed or the RESET/RETURN button is pushed, and it stops when the shutter end (off-on) passed thru the lead -in SW.

4. DISC UNLOADING/STANDBY

(1) The caddy rail raises the Disc and Spine until it reaches the top position.
(2) The STANDBY INDICATOR starts to flash, and shows that the Disc is ready for removal.

5. REMOVAL OF DISC

(1) As the empty Caddy is inserted, the Disc and Spine are placed into it, and when the Disc is removed the player is turned off.
(2) To protect the Disc from possible damage or warping, if the disc is left inside the player longer than a few minutes, it is automatically shifted from the STANDBY MODE to the PAUSE MODE at the lead-in position. Push the RETURN button to remove the Disc.

SERVICING NOTE:
When servicing with MAIN PWB lifted, please observe either of the following sequences.

(1) Set MAIN PWB on the Lower Cover Ass'y in place and after the Lead-in and Play-back starts, lift and set it at servicing position.
(2) Another way to start playing for servicing purpose with MAIN PWB lifted,
  (a) Insert and keep a coin or any interceptive object between LEAD-IN SW (SW 703) and press PLAY button ... Loading and ARM moves.
  (b) After ARM reaches well inside ~~this~~ Disc, pull out – reinsert – pull out again above interceptive object through LEAD-IN SW, then ARM stops, and Lead-in/Play operation start.

CAUTION:
Do not activate FWD SEARCH x120 (▶▶▶) or REV SEARCH x120 (◀◀◀) button while MAIN PWB lifted and make STYLUS tip come across/off the Disc edge, otherwise this may damage the STYLUS.

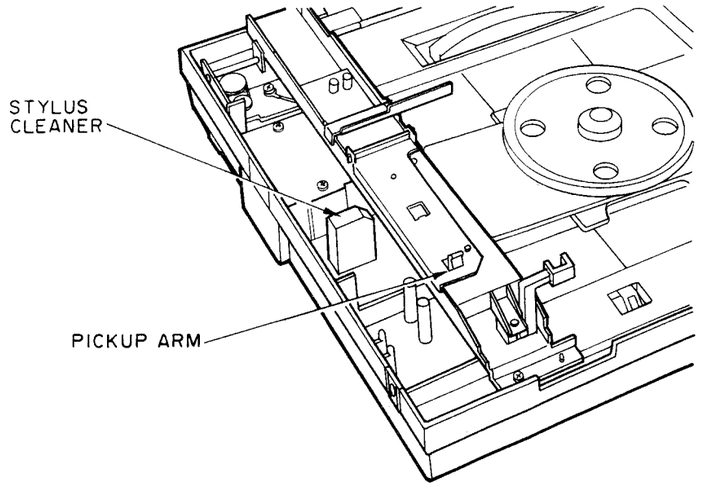


Figure 1 Inside view at Playback Operation.

VIP201P
VIP202P

x4, STEP

VIP 201P
P 202P

is ON.
turntable)

eaches its
eration is

door from
position.
ed during

OPERATION SEQUENCES (CONTINUED)

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(1) The pickup arm moves to the right, (PLAYTIME INDICATOR shows this movement) and stops at the lead-in point, which is determined by the lead-in switch (photo-coupler type on MAIN P.W.B.) and the lead-in shutter on PICKUP ARM.
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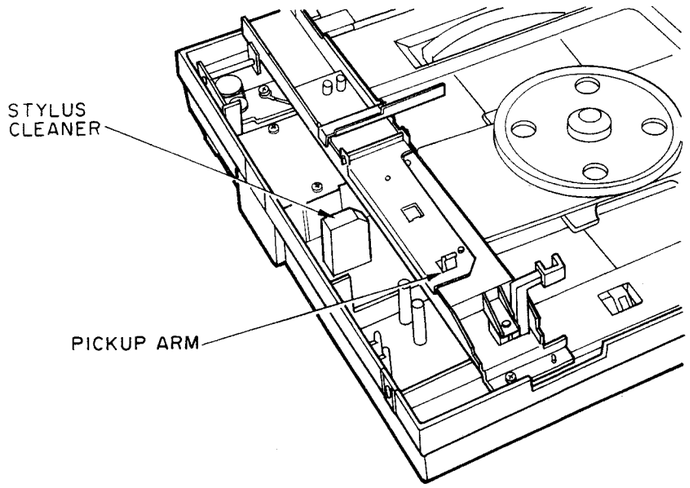
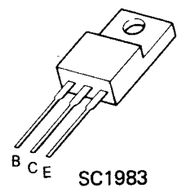
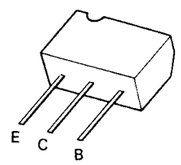


Figure 1 Inside view at Playback Operation.

TERMINAL VIEWS OF SEMICONDUCTORS



SC1983



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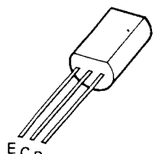
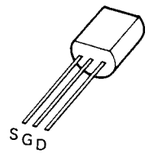
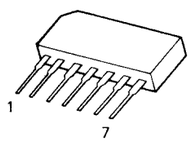
2SC2021



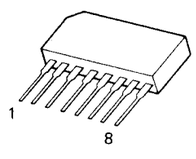
2SB562
2SD468



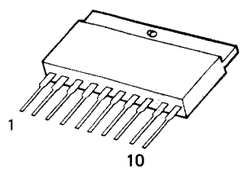
2SK40



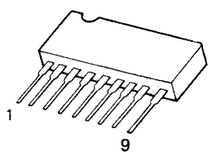
μPC1037H



μPC1391H



BA6109



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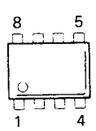
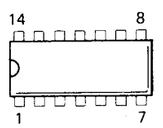
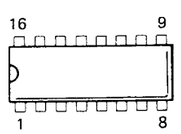


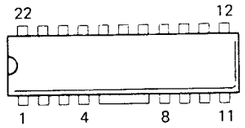
RC4558



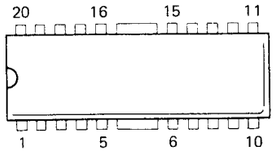
HD14001BP
HD14066BP



HD14511BP TA7685P
HA15004 TA7691P
HY6589 μPD4052BC



TL8506P



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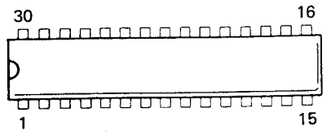
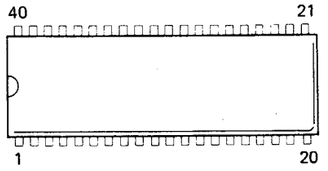


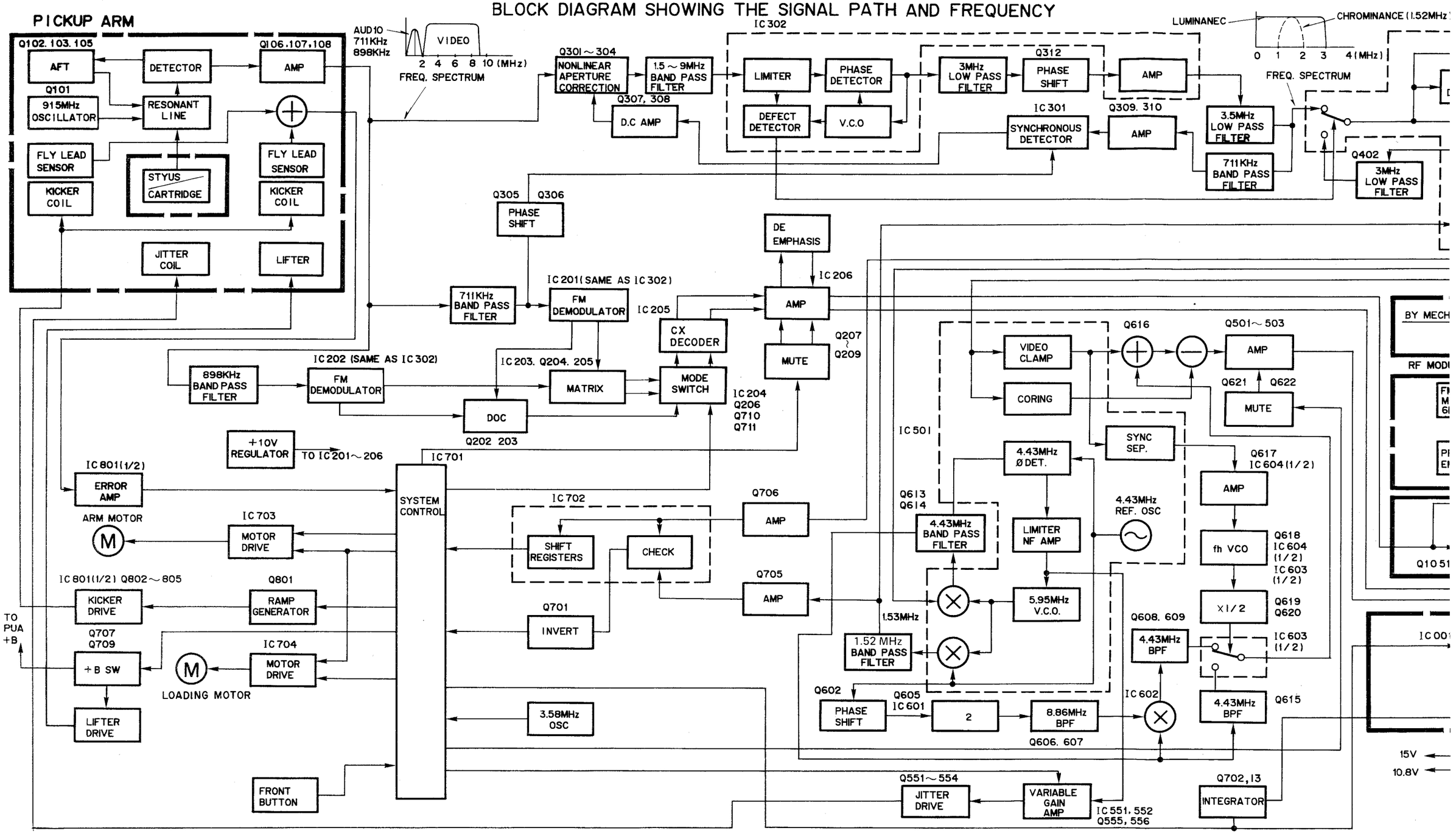
TA7683P



HD6805WOP

BLOCK DIAGRAM

BLOCK DIAGRAM SHOWING THE SIGNAL PATH AND FREQUENCY



BLOCK DIAGRAM

M SHOWING THE SIGNAL PATH AND FREQUENCY

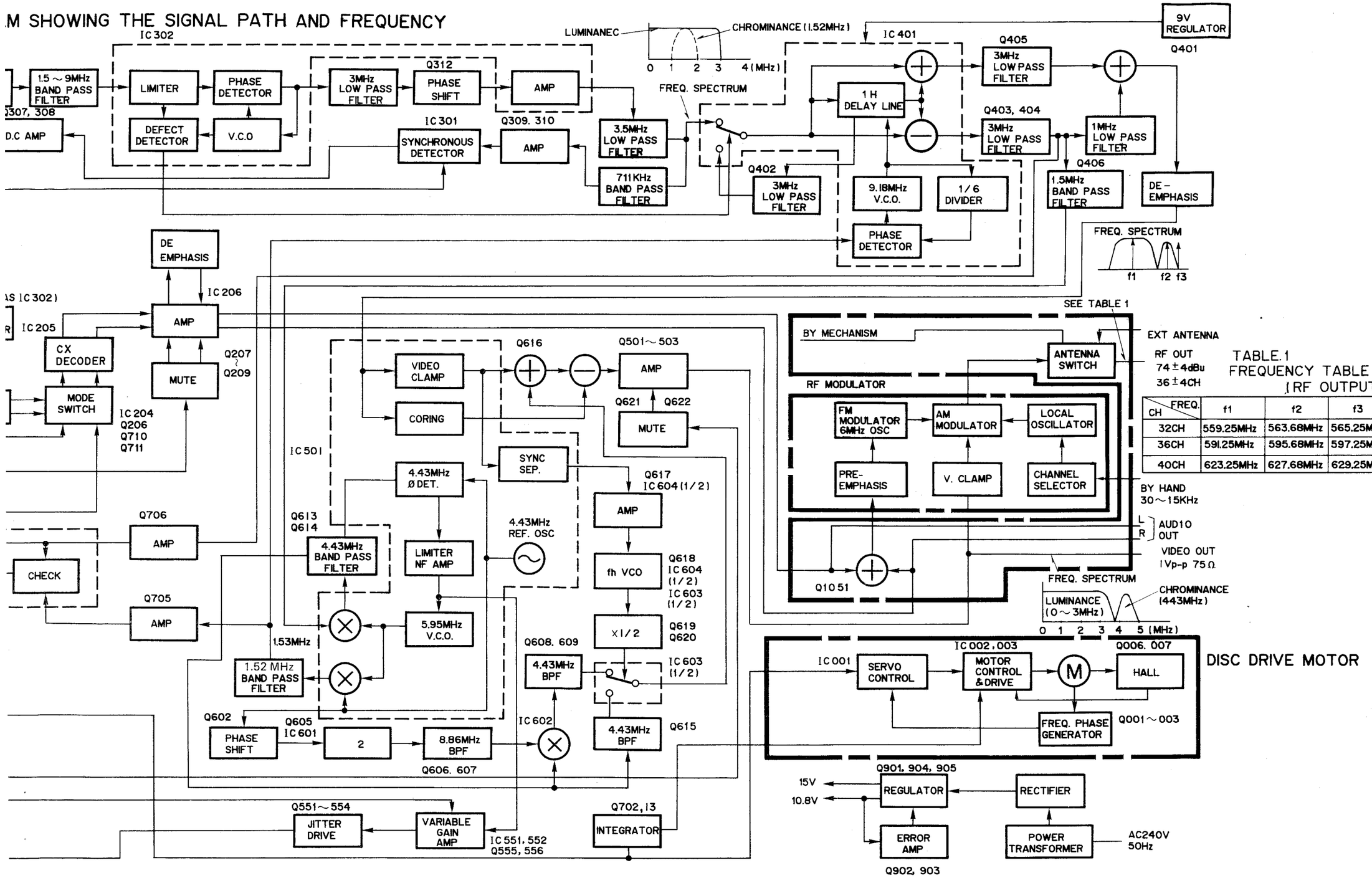


TABLE.1
FREQUENCY TABLE
(RF OUTPUT)

CH \ FREQ.	f1	f2	f3
32CH	559.25MHz	563.68MHz	565.25MHz
36CH	591.25MHz	595.68MHz	597.25MHz
40CH	623.25MHz	627.68MHz	629.25MHz

ELECTRICAL ALIGNMENTS

(1) When servicing with the MAIN P.W.B. lifted, please observe SERVICING NOTE on page 6.
(2) Cover the LEAD IN SW (D722) from light when servicing with TOP COVER off.

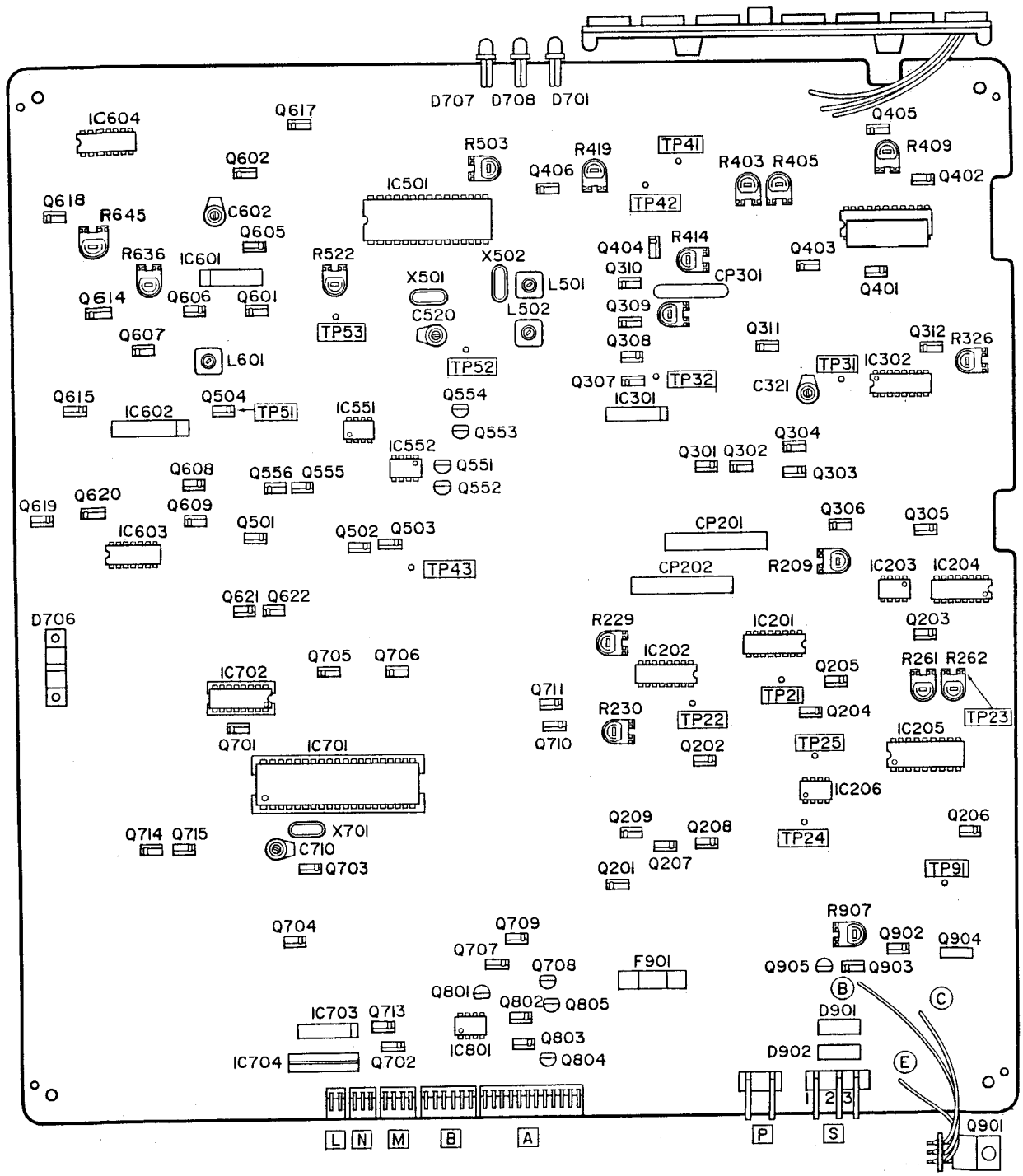


Figure 2 Location of Alignment points

ELECTRICAL ALIGNMENTS (CONTINUED)

• VIDEO PROCESS CIRCUIT

(1) Play the Service Alignment Disc or equivalent.
(2) Confirm the voltage at TP91 is 10.8±0.2V.
(3) Use an insulated screwdriver for adjustment.

1. Subcarrier Reference Oscillator Adjust (Sub.C – C520) ..... See Figure 2.

(1) Connect frequency counter via (x10) probe to TP61.
(2) Adjust C520 for 4.433619 MHz±10 Hz.

2. VCXO Adjust-1 (VCXO fo – L502 ..... See Figure 2.

(1) Connect frequency counter, via (x10) probe to TP52.
(2) Using Alignment Disc – any signal, place player in pause mode.
(3) Adjust L502 for 1521.52±0.1 kHz.

3. Video Demodulator VCO Adjust (FM fo – C321) ..... See Figure 2.

(1) Connect Frequency Counter via (x10) probe to TP31.
(2) Connect R318 with 0.1μF/50V at both legs.
(3) Adjust C321 for 5.30MHz±50kHz.
(4) Remove 0.1 μF from R318.

4. NLAC Adjust (NLAC – R334) ..... See Figure 2.

(1) Connect oscilloscope to TP32.
(2) Ground the collector of Q310.
(3) Adjust R334 for 6.8V±0.1V.
(4) Remove oscilloscope.

5. Luminance Channel Null Adjust (Y.ADJ – R405) ..... See Figure 2.

1. Use Alignment Disc color bar signal (segment D)
2. Connect oscilloscope to TP41.
3. Adjust R405 for minimum chroma information as shown in Figure 3.

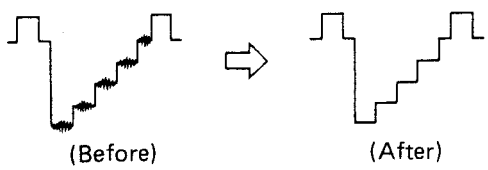


Figure 3

6. Chroma Channel Null Adjust (C.ADJ – R403) ..... See Figure 2.

(1) Use Alignment Disc color bar signal (segment D).
(2) Connect oscilloscope to TP42.
(3) Adjust R403 for minimum p-p signal as shown in Figure 4.

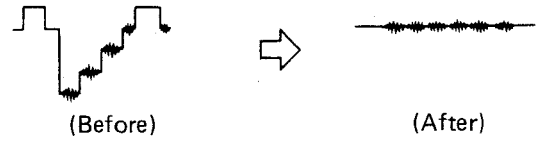


Figure 4

7. Vertical Detail Level Adjust (V.D.ADJ – R414) ..... See Figure 2.

(1) Use Alignment Disc color bar signal (segment D).
(2) Connect oscilloscope to TP43.
(3) Adjust R414 so that the pulse level matches before and after transition from vertical equalizing pulses to vertical sync pulses.

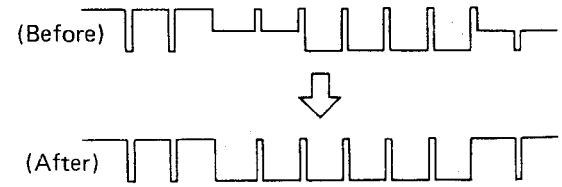


Figure 5

8. 8.86 MHz Adjust (8.86 MHz – L601) ..... See Figure 2.

(1) Connect oscilloscope to TP62.
(2) Adjust L601 for maximum pp.

9. f_H·VCO Adjust (f_H·VCO – R645) ..... See Figure 2.

(1) Connect dual trace oscilloscope to TP43 and TP63. Triqqer by TP63.
(2) Adjust R645 so that the rising edge of $f_H/2$ at TP63 stays between 1/2 ~ 1/3 of H-pulse from the rising edge at TP43.

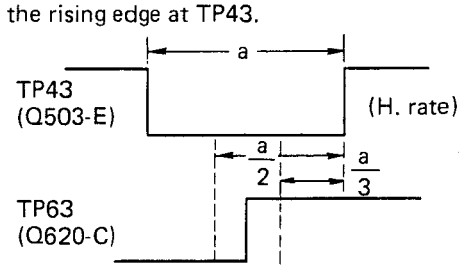


Figure 6

10. -V Phase Adjust (-V.Phase – C602) ..... See Figure 2.

(1) Use Alignment Disc color bars (segment D-6 min.)
(2) Connect vectorscope to TP43 (input) and to Q605-E (EXT).
Pre-adjust R636 so that level difference between +V and -V become equal.
(3) Adjust C602 for each colour stays within ±5 degree against standard colour phases.

ELECTRICAL ALIGNMENTS (CONTINUED)

11. -V Level Adjust (-V.LEVEL – R636) ..... See Figure 2.
(1) Use Alignment Disc color bars (segment D-6 min.)
(2) Check the 10. -V Phase Adjust above.
(3) Adjust R636 so that the colour level of +V, -V become equal on TV screen or vectorscope.

12. VIDEO LEVEL Adjust (VIDEO LEVEL– R326) ..... See Figure 2.
(1) Insert Alignment Disc. Play segment E. (Elapsed time 11 min.)
(2) Terminate B2 with 150Ω.
(3) Connect oscilloscope to TP43.
(4) Adjust R574 for an output of 2.0±0.1Vp-p.

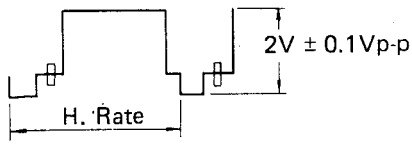


Figure 7

13. Chrome Level Adjust (C.LEVEL – R419) ..... See Figure 2.
(1) Use Alignment Disc color bar signal (segment D).
(2) Connect oscilloscope to TP43.
(3) Adjust R410 so that the p-p level of color reference burst and sync tip at blanking are the same.

14. D.O.C. freedback level adjust (D.O.C. – R409) ..... See Figure 2.
(1) Insert Alignment Disc. Play section H (Elapsed time 23 min.).
(2) Adjust R409 for minimum dropout (use TV as monitor).

15. VCXO Adjust-2 (VCXO.G – R503 and VCXO.SYM – L501) ..... See Figure 2.
(1) Using Test Disc – any signal, place player in pause mode.
(2) Connect pin (21) of IC501 to +5V source (Q905-E), pin (8) of IC302 to GND with short clips, and frequency counter, via (x10) probe to TP52.
(3) Connect 1.0 meg resistor from pin (2) of IC551 to 15V source (Q904-E). Adjust R503 for 1523.72 ±0.1kHz. Remove 1.0meg resistor from 15V source.
(4) Connect 1.0 meg resistor from pin (2) of IC551 to GND. Adjust L501 for 1519.32±0.1kHz. Remove 1.0 meg resistor.
(5) Repeat step (3) (4) and VCXO Adjust-1 until limits of each are met.
(6) Remove short clips.

16. Phase Detector Gain Adjust (P.D. GAIN – R522) ..... See Figure 2.
(1) Use Alignment Disc – any signal, player in play mode.
(2) Connect oscilloscope to TP53.
(3) Short pin (18), (19) and (26) of IC501.
(4) Adjust R522 for 3Vp-p indication on oscilloscope.

• AUDIO PROCESS CIRCUIT

1. VCO-1 Adjust (VCO 1 – R209) ..... See Figure 2.
(1) Insert the disc into the player (pause mode).
(2) Disconnect pin (12) interconnecting plug A.
(3) Short A11 and A12 with clip lead.
(4) Connect frequency counter via (x10) probe (see note) to TP21.
(5) Connect 1μF/50V between pin (3) of CP201 and GND.
(6) Adjust R209 for 710 kHz±3 kHz.

2. VCO-2 Adjust (VCO 2 – R229) ..... See Figure 2.
(1) Insert the disc into the player (pause mode).
(2) Disconnect pin (12) interconnecting plug.
(3) Short A11 and A12 with clip lead.
(4) Connect frequency counter via (x10) probe (sec note) to TP22.
(5) Connect 1μF/50V between pin (3) of CP201 and GND.
(6) Adjust R229 for 897 kHz±3 kHz.
(7) Remove clip lead of capacitor and reconnect pin (12) interconnecting plug.

Note: Capacity of (x10) probe is 15 pF MAX.
Resistance of (x10) probe is 1MΩ MIN.

3. Audio Separation Adjust (SEP. – R219) ..... See Figure 2.
(1) Short emitter and base of Q711 with clip lead.
(2) Short emitter and Collector of Q710.
(3) Insert Alignment disc. Play segment F (Elapsed time 15 min)
(4) Connect oscilloscope to TP23.
(5) Adjust R230 for minimum p-p signal.
(6) Remove clip lead.

4. Audio Level Adjust (L.LEVEL – R261 R.LEVEL – R262) ..... See Figure 2.
(1) Short Collector and emitter of Q711.
Short Collector and emitter of Q710.
Short Base and emitter of Q206.
(2) Insert Alignment Disc and play segment C (Elapsed time 5 min).
(3) Ground the slider of R262.
Connect oscilloscope to TP24.
Adjust R261 for 2.2Vp-p.
(4) Ground the slider of R261.
Connect oscilloscope to TP25.
Adjust R262 for 2.2Vp-p.

• POWER SUPPLY ALIGNMENT

1. +B adjust (+B ADJ – R907) ..... See Figure 2.
(1) Supply AC input 240V, 50 Hz to PLAYER.
(2) Connect digital voltmeter to TP91 on main PWB.
(3) Allow warmup time of 30 seconds.
(4) Adjust R907 (on Power Supply Board) for 10.8 ±0.1 volt.

2. +15V Check
(1) Check at emitter of Q904 for 15.0 volts ±1V.

MECHANICAL ADJUSTMENTS

• GAP WIDTH ADJUSTMENT

When the Pickup Arm Assembly, the Disc Drive Motor or the Bottom Case is replaced, the following adjustment is necessary to keep the gap width between the rubber surface of the turntable and the pickup arm chassis constant.

1. How to move the Pickup Arm Assembly

(1) Remove the Stylus Cartridge.

(2) Move the Pickup Arm Assembly, please observe SERVICING NOTE on page 5.

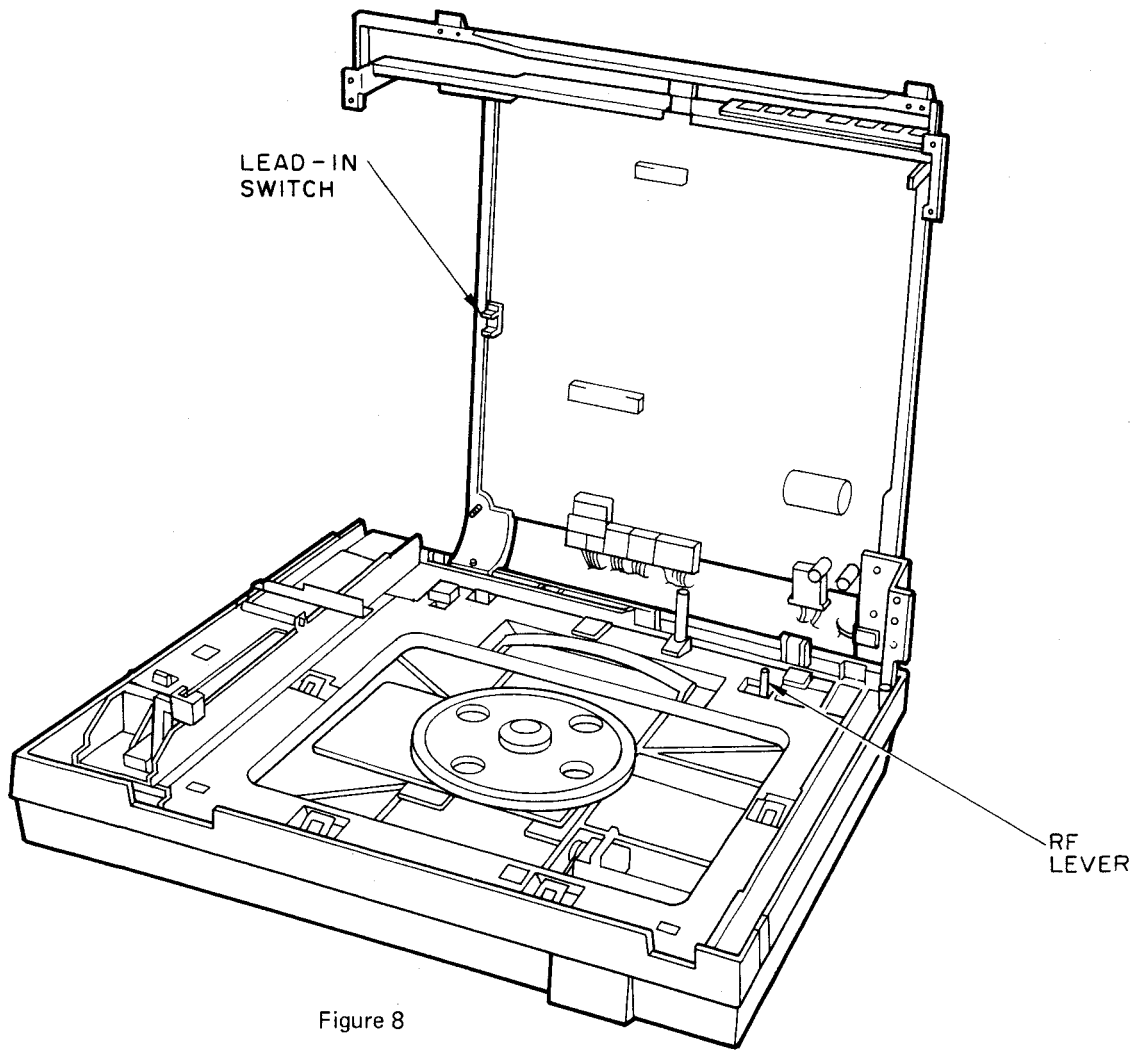


Figure 8

MECHANICAL ADJUSTMENTS (CONTINUED)

2. How to adjust the gap width

(1) Check the gap width between the rubber surface of the turntable and the pickup arm as shown in Figure 9.

(2) No adjustment is necessary if the gap width is between 4.1mm and 4.5mm. If the gap width is not in that range, rotate Height Adjust Screw to adjust the gap to 4.3±0.2mm (11/64'±8 mil).

(3) If it is very difficult to adjust the gap width, the Pickup Arm Assembly or the Disc Motor might be mechanically damaged.
Repair or replace the damaged parts.

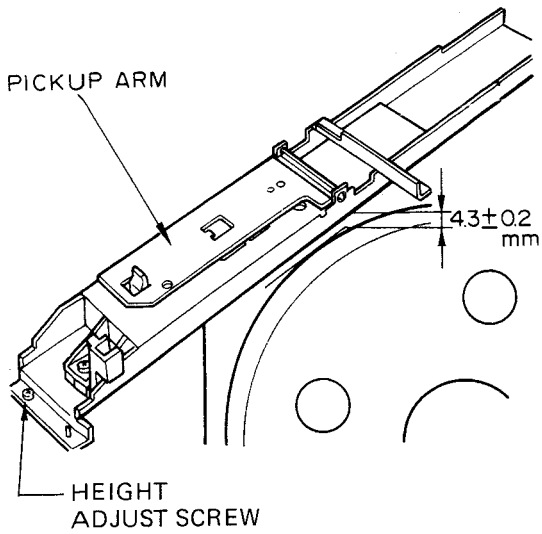


Figure 9

- LEAD-IN TIME ADJUSTMENT

This adjustment is necessary when the Pickup Arm Assembly is replaced or the following situation is observed.
The Play Time Indicator moves to the left a little after it moves from the Standby Position and stops at Lead-in Position before the picture comes on.

CAUTION 1; This adjustment is not necessary when the Play Time Indicator moves to the right a little (about 1mm) after it moves from the Standby Position and stops at the Lead-in Position before the picture comes on.

CAUTION 2; This adjustment must be done on condition that the Main Circuit Board is set, but over the Bottom Case correctly as shown in Figure 10.

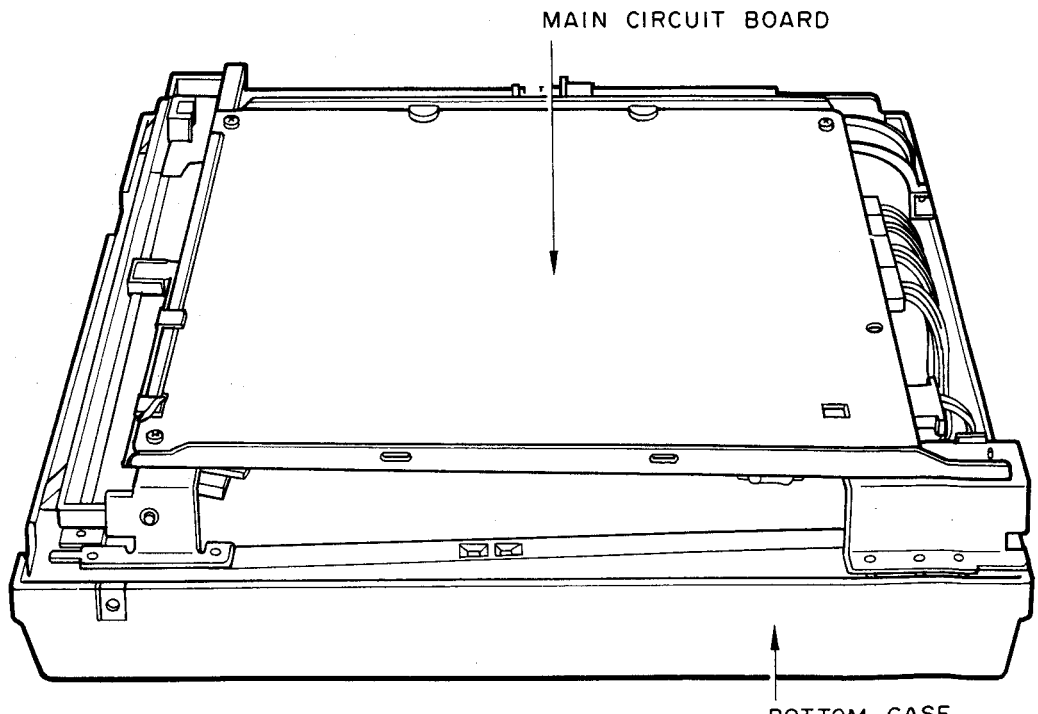


Figure 10

MECHANICAL ADJUSTMENTS (CONTINUED)

1. How to adjust the Lead-in Time

(1) Remove the Top Cover and connect the player to a TV receiver or a video monitor.
(2) Ground the collector of Q621 with a clip lead.
(3) Insert a test disc into the player.
(4) Check the display. The figure on the TV or the monitor shows the landing point of the Stylus on the test disc (Lead-in Time).
If it is in the range of X^{+12}_{-24} seconds, the adjustment is not necessary. If it is not in that range, the following adjustment is necessary.
(5) Adjust the Lead-in Time by turning the screw as shown in Figure 11.
One rotation of the screw corresponds about 30 seconds.

Note:

(1) "X" is the nominal Lead-in Time seconds for each test disc. The exact value of "X" depends on the diameter of the first groove on the test disc. This diameter in inches is written on each test disc caddy label.
Use the following formula to determine the exact value of "X".

"X" = (diameter of the first modulated groove − 11,507) x 642

Example
Diameter of the first modulated groove
= 11,560

"X" = (11,560 − 11,507) x 642
= 0,053 x 642
= 34 seconds

If the figure on TV is 20 seconds, Lead-in Time is within the required range of 34^{+10}_{-20} seconds. No adjustment is required.

(2) If Lead-in Time is not within the range, adjust Lead-in Time by turning the screw as shown in Figure 11.
One rotation of the screw corresponds about 25 sec;
Turn clockwise for outside direction.

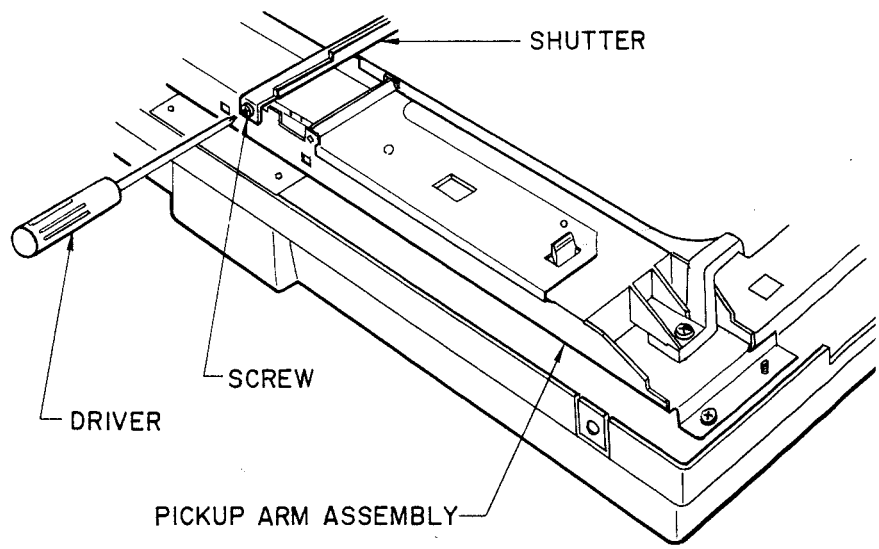


Figure 11

REPLACEMENT OF THE STYLUS/CARTIDGE

1. Push the plastic projection Lib and open the stylus cover as shown in Figure 12.
2. Hold the Stylus/Cartridge between the fingers as shown in Figure 13.
3. Insert the new Stylus/Cartridge in the same direction as the old one.
4. Close the stylus cover until the 'Click" sound is heard.

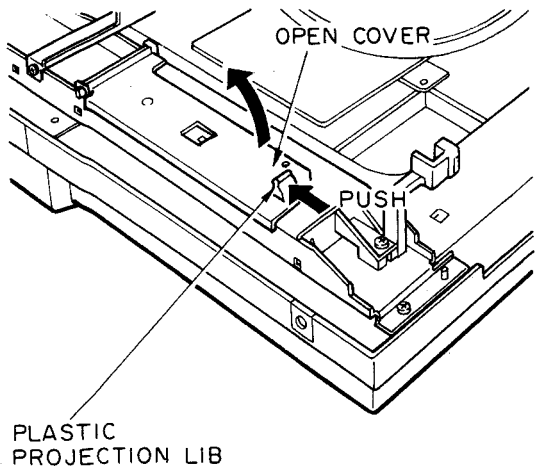


Figure 12

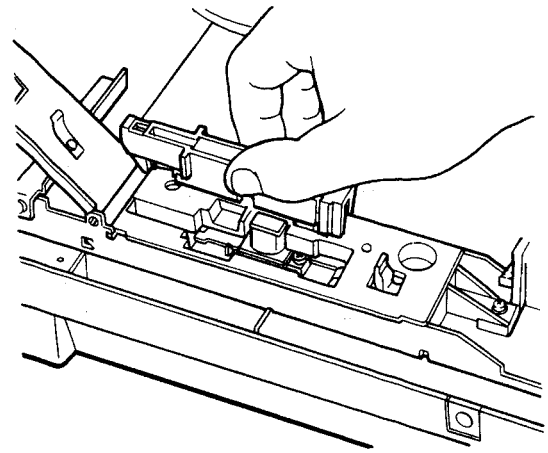


Figure 13.

MECHANICAL DISASSEMBLY

REMOVAL OF THE TOP COVER

1. Remove the two screws on both sides (A) (One screw on each side).
2. Remove the two screws (B) at the rear as shown in Figure 14.

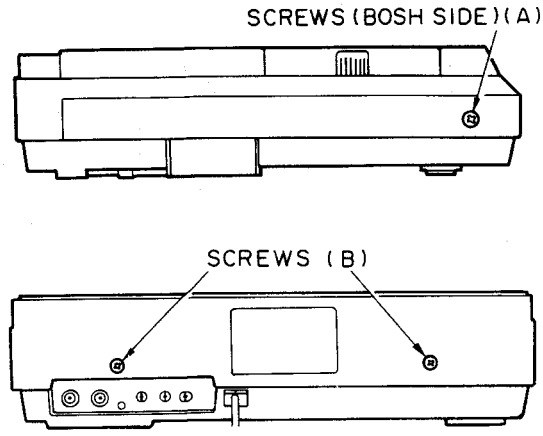


Figure 14. Removal of the top cover

REMOVAL OF THE MAIN CIRCUIT BOARD

1. Remove the Top Cover.
2. Lift up the Main Circuit Board from the Bottom Case, turn and set it in the upright position as shown in Figure 15. This is the service position.
3. To remove the Main Circuit Board, disconnect connectors from the bottom edge and remove the Side Indicator Switch on the Caddy Rail Assembly and lift up the Main Circuit Board straight.

CAUTION: Be careful not to break the plastic claws of the caddy rail assembly which hold the Side Indicator Switch.

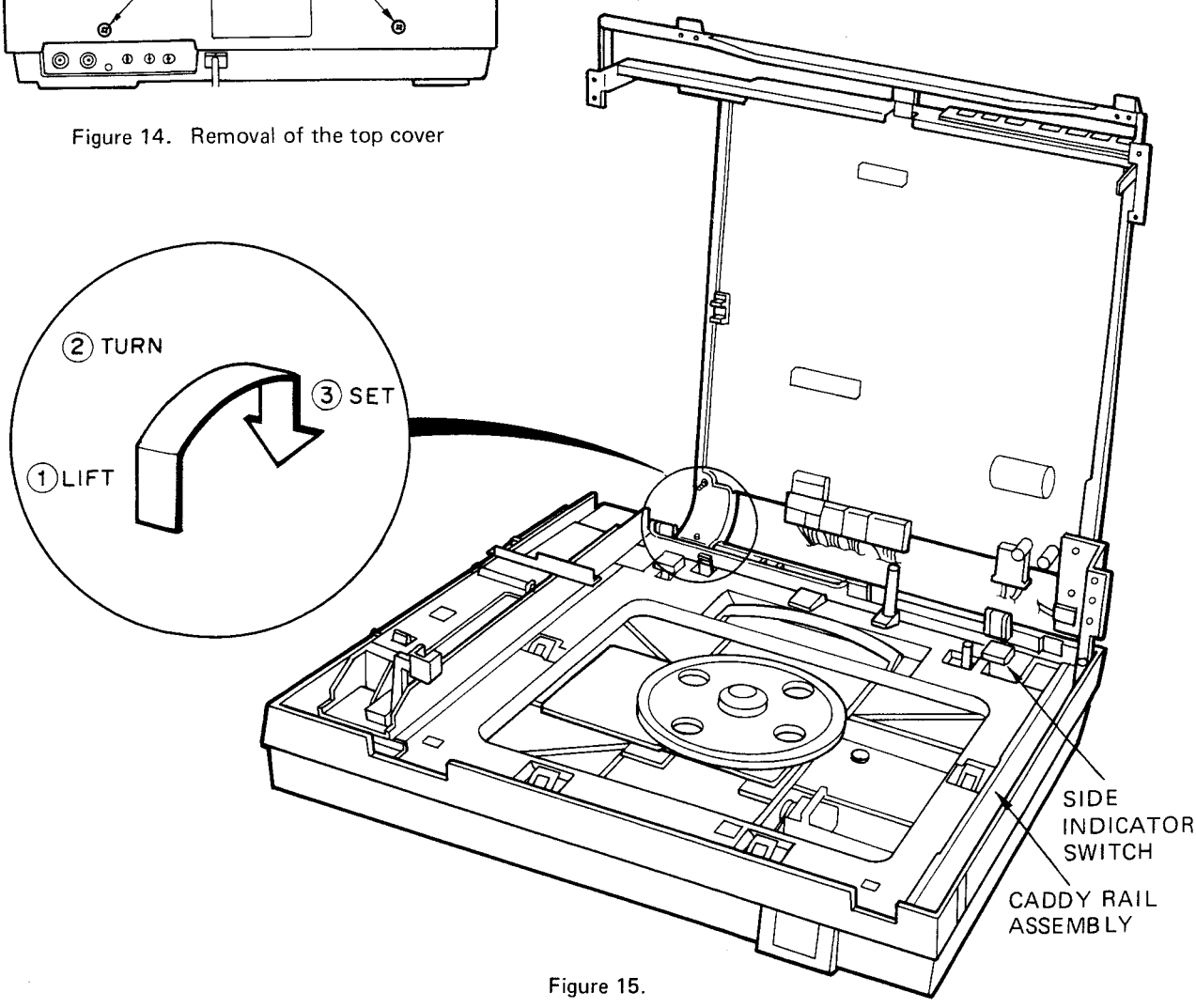


Figure 15.

MECHANICAL DISASSEMBLY (CONTINUED)

REMOVAL OF THE PICK-UP ARM ASSEMBLY

1. Remove the STYLUS/CARTRIDGE.
2. Set the main circuit board in the service position.
3. Unscrew the two screws (A) on the Pickup Arm Assembly (See Figure 16)
4. Disconnect the 12P connector from the Main Circuit Board and remove the Pickup Arm Assembly.

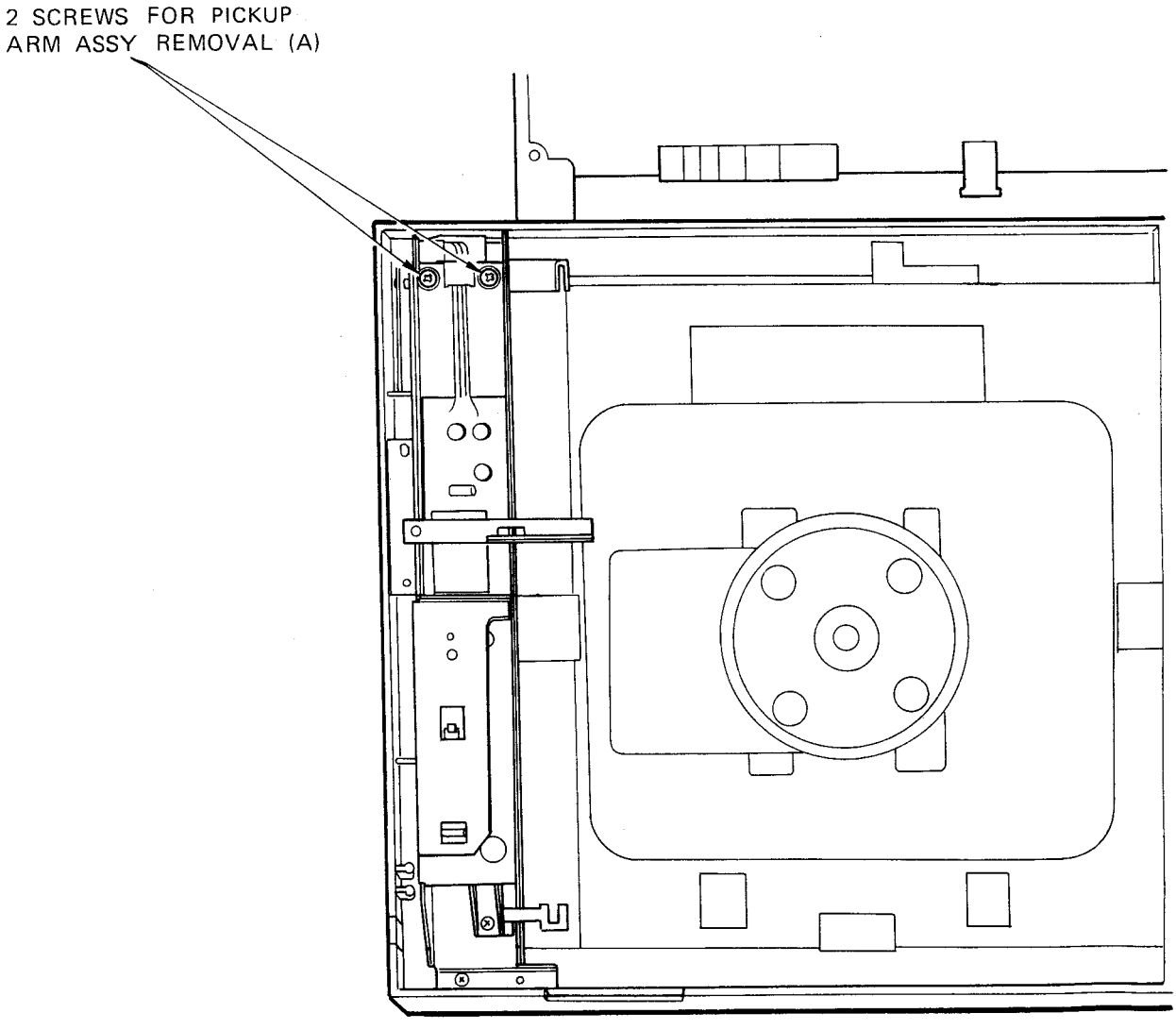


Figure 16.

MECHANICAL DISASSEMBLY (CONTINUED)

- **REMOVAL OF THE CADDY RAIL ASSEMBLY**

1. Remove the Side Indicator Switch.
2. Lift up the right side of the Caddy Rail Assembly, then the shaft at the rear right will come out; slide it to the right.
   Then the Caddy Rail Assembly can be removed.

CAUTION 1. Be careful not to break the plastic claws which hold the Side Indicator Switch.
2. Be careful not to damage the shutter and the Play Time Indicator on the Pickup Arm Assembly when removing the Caddy Rail Assembly.

- **REMOVAL OF THE DISC DRIVE MOTOR ASSEMBLY**

1. Remove the Caddy Rail Assembly.
2. Disconnect M connector from MAIN P.W.B.
3. Remove four screws (A) as shown in Figure 17.

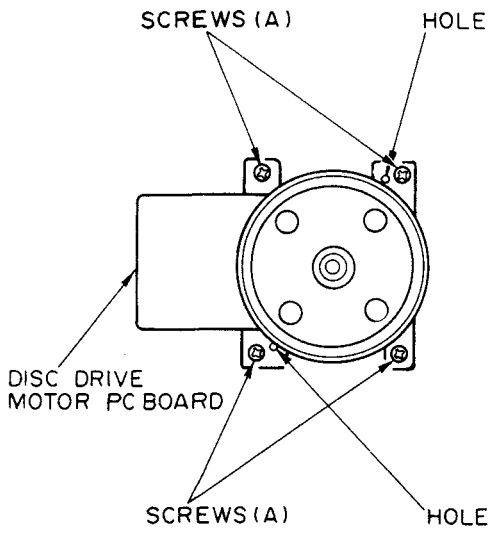


Figure 17. Removal of the motor assembly.

- **REMOVAL OF THE LOADING MOTOR**

1. Remove the Caddy Rail Assembly.
2. Disconnect N-connector from the Main Circuit Board.
3. Remove the Rubber Belt from the Loading Motor Pulley.
4. Shift the Loading Motor to the right while pushing the claw of the Bottom Case.

CAUTION 1. Be careful not to break the claw of the Bottom Case.
2. Don't let oil get onto the Rubber Belt.

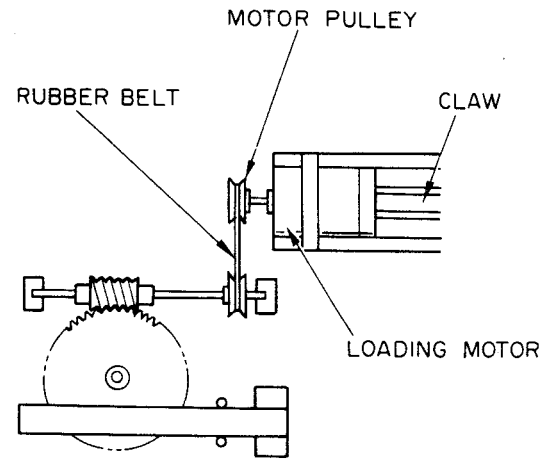


Figure 18. Removal of the Loading Motor

MECHANICAL DISASSEMBLY (CONTINUED)

- **REMOVAL OF THE POWER TRANSFORMER/POWER SWITCH**

1. Unplug the AC cord from AC outlet.
2. Remove the Caddy Rail Assembly.
3. Disconnect P-connector and S-connector from the Main Circuit Board.
4. Remove the Pickup Arm Assembly.
5. Remove the two screws (B).
6. Remove the two screws (C).
7. The power Transformer/Power Switch can be removed.

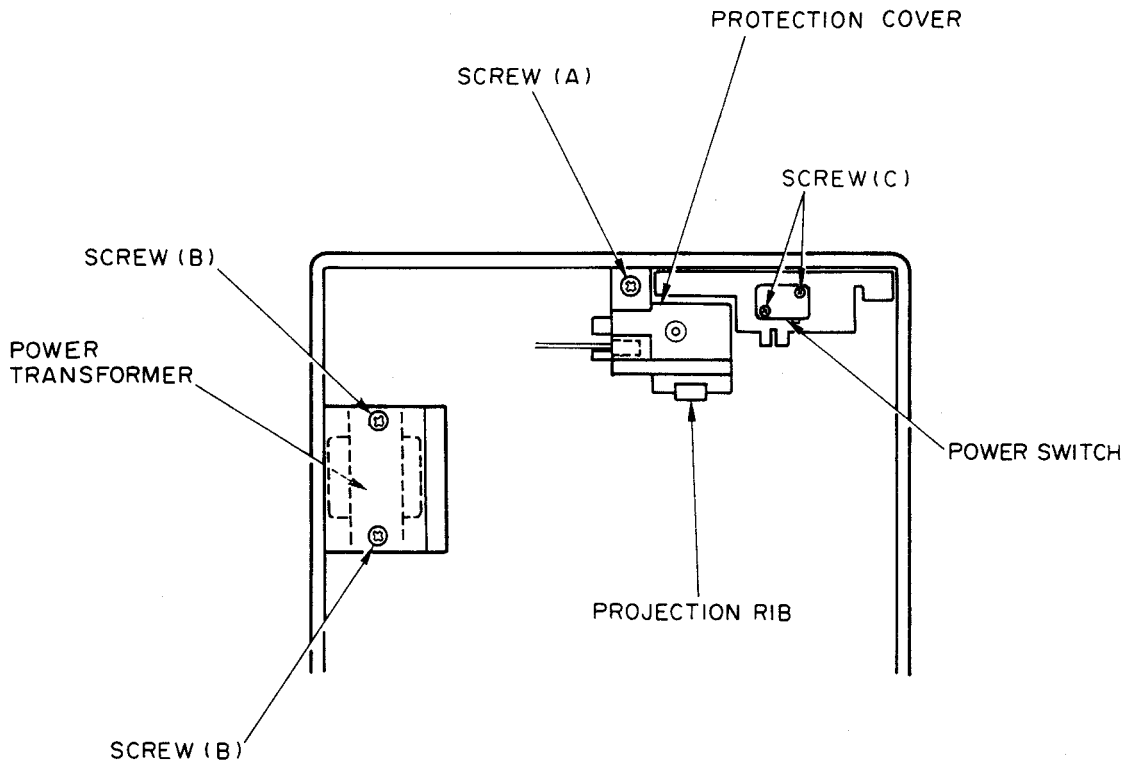


Figure 19.

MECHANICAL DISASSEMBLY (CONTINUED)

REMOVAL OF THE PICK-UP ARM DRIVE MOTOR ASSEMBLY

1. Unplug the AC cord from AC outlet.
2. Remove the Caddy Rail Assembly. (See page 19)
3. Remove the Pickup Arm Assembly. (See page 19)
4. Remove the Rubber Belt as shown in Figure 20.
5. Remove the screw (A), lift up the left end of the Arm Drive Plate a little and remove it from the claw of the Bottom Case by sliding it to the right.
6. Then the Pickup Arm Drive Motor can be removed.

CAUTION: Don't let oil get onto the Rubber Belt.

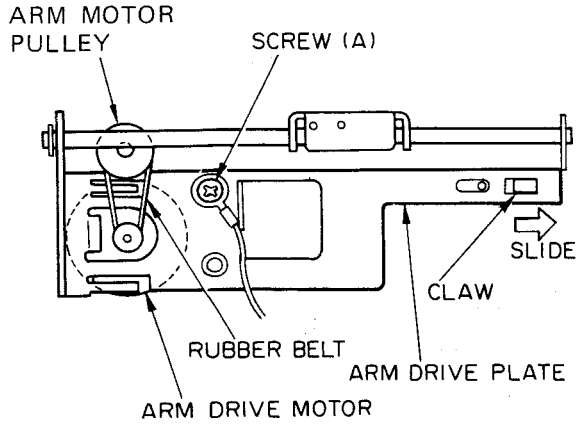


Figure 20.

REMOVAL OF THE DISC

The player features and automatic play function, and if something goes wrong (for example, a fuse blows, etc.) while playing, and it is necessary to remove the Disc from the player, please follow the next procedure according to the cases below.
If the empty caddy is missing, an empty caddy is available. (RCA stock No. 149073).

CASE A. LOADING mechanism is OK

1. Move the Pickup arm assembly to the left by turning the Arm Motor Pulley counterclockwise and set it to the STANDBY position.
2. Disconnect N-plug from the MAIN CIRCUIT BOARD.
3. Apply DC 10V to N-plug, (+10V for N3, 0V for N2).
4. Then the Disc is lifted up and set to the STANDBY mode for removal.
5. Remove the Disc with an empty caddy.

CASE B. LOADING mechanism is not OK.

1. Move the Pickup Arm Assembly to the left by turning the arm motor pulley counterclockwise and set it to the STANDBY position.
2. Reserve the Disc in the empty caddy.
3. Lift up the Caddy Rail Assembly with the spine on it by turning the Loading Motor Pulley as shown in Fig. 17.
4. After the Caddy Rail Assembly reaches the top position, put the Disc on the Caddy Rail Assembly.
5. Remove the Disc by inserting the empty caddy.

CAUTION:

1. Do not let oil get onto the Rubber Belt while rotating the pulley.
2. Be careful not to damage the disc by touching — finger prints degrade the picture quality, or by scratching with the Shutter or the Play Time Indicator on the Pickup Arm.

REMOVAL OF THE CADDY

If a caddy is locked inside the player and unable to be removed, please follow the next procedure, before checking the caddy chuck mechanism.

1. Insert a driver into the player through the hole which is pointed by an arrow on the bottom surface of the Bottom Case.
2. When the driver reaches a metal plate (Caddy Hold Lever), thrust the metal plate with the driver. Then the lock will be disengaged.
3. Push the caddy again, them the caddy can be removed with the spine and the disc.

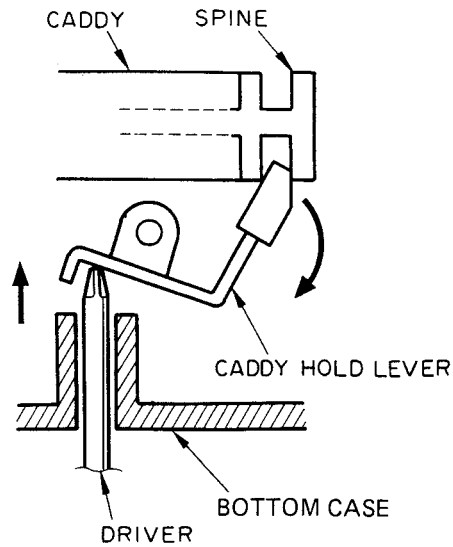


Figure 21.

CIRCUIT DESCRIPTION

1. VIDEO DISC SIGNAL RETRIEVAL

1.1. VIDEO DISC SIGNAL RETRIEVAL

CED Video Disc system utilizes the capacitive pickup system. In this system FM modulated carrier signals are stored on a conductive plastic disc by varying the depth of the grooves. The television signal is retrieved from the video disc by detecting the changing capacity between a metalized electrode on the stylus and the conductive disc (Figure 22). The capacity between the disc and the stylus will change as a function of the carrier modulation of the video disc grooves. The resultant changing capacity is then coupled to a 890 MHz tuned line in the resonator assembly which is driven by a 896 MHz oscillator as illustrated in Figure 23. Changing capacity from the stylus modulates the resonant frequency of the 890 MHz tuned line, thus changing the operating point of the 896 MHz oscillator energy on the tuned line. This is turn amplitude modulates the 896 MHz oscillator signal. This action is illustrated in Figure 24. The amplitude modulated 896 MHz oscillator signal is then applied to a detector circuit which peak rectifies the 896 MHz oscillator signal.

The signal recovered from peak detecting the oscillator signal is therefore, an electrical replication of the information in the Video disc grooves. In summary, the video and audio carrier signals in the disc grooves are recovered by modulating the 896 MHz signal to provide a voltage at the detector which reproduces the original video carrier information. Figure 25 is a schematic diagram of the oscillator, resonator and detector circuit.

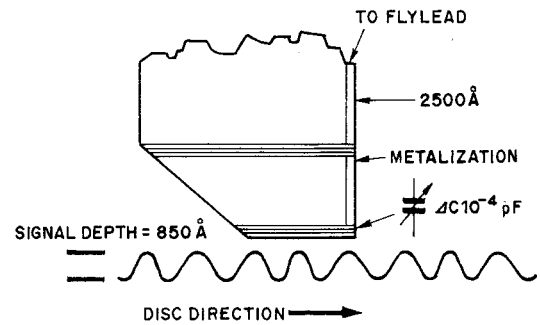


Figure 22. Enlarged Diagram of Stylus Pickup Operation

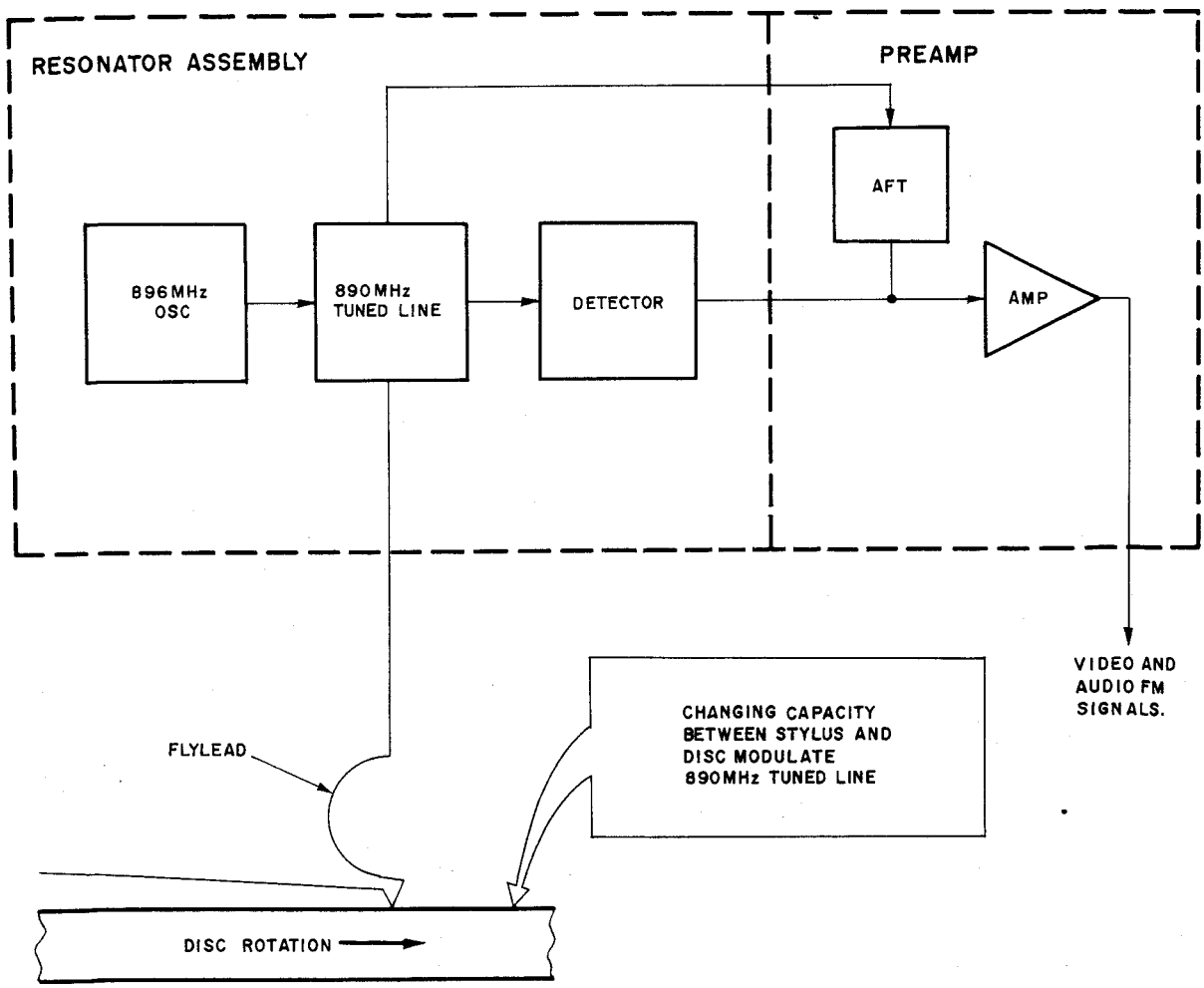


Figure 23. Video signal Pick-up Block Diagram

The output of the detector is then coupled to preamplifier where the signal is amplified before application to the various processing circuits in the player. Also, an AFT circuit is incorporated on the preamp board.

This circuit monitors the DC voltage level developed by the detector, compares this voltage to a preset reference, and in turn modulates the effective length of the tuned line by applying a DC voltage to a varactor diode.

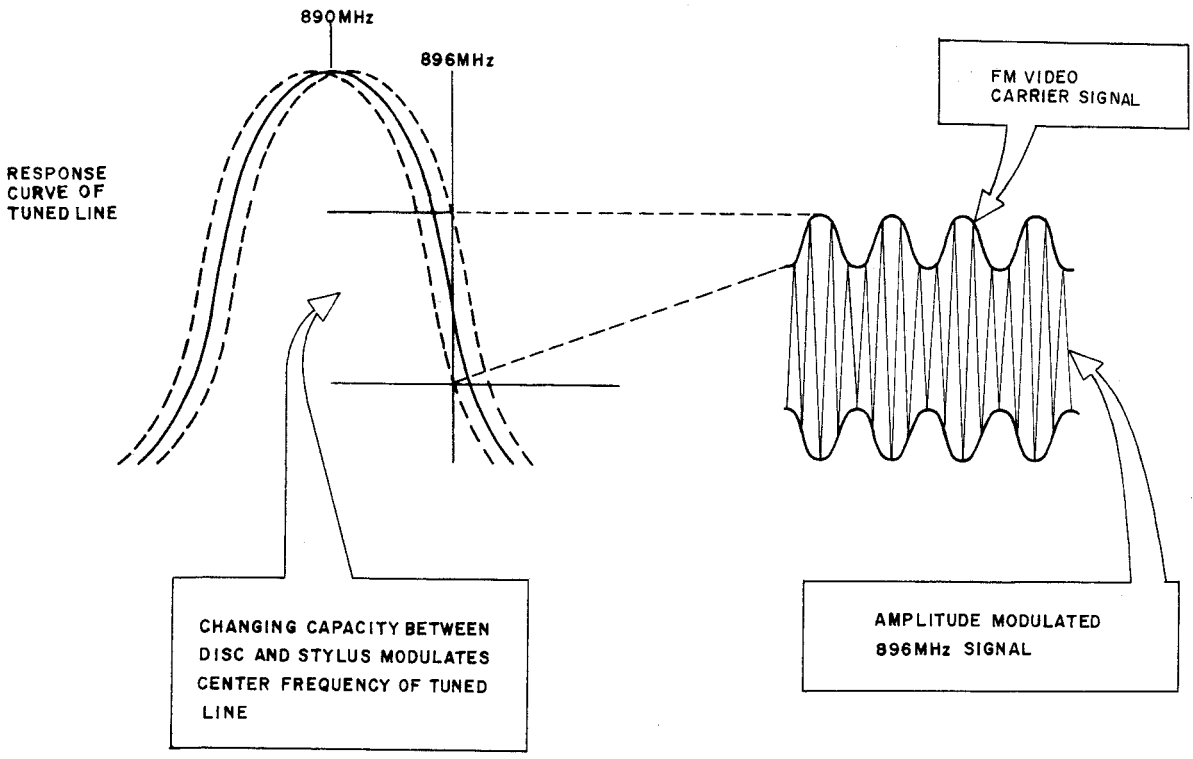

890MHz
896MHz
FM VIDEO CARRIER SIGNAL
RESPONSE CURVE OF TUNED LINE
CHANGING CAPACITY BETWEEN DISC AND STYLUS MODULATES CENTER FREQUENCY OF TUNED LINE
AMPLITUDE MODULATED 896MHz SIGNAL

Figure 24. Video Signal Retrieved by Modulation 896 MHz Oscillator.

1.2. STYLUS OPERATION

As mentioned previously, the television signal is stored on the disc in the form of modulated depressions in the disc grooves. The signal is recovered from the disc by the action of a diamond stylus (Figure 22) which has a thin metalization on the trailing edge. This metalization is typically 2500 Angstroms thick (.0000098 inches). The typical depth of the modulation on the video disc is approximately 850 Angstroms (.0000033 inches). The video signal is recovered in the Video Disc player by rotating the disc beneath the stylus. As the video disc groove passes by the metalization on the diamond stylus, the effective capacity between the metalized electrode on the stylus and the disc will vary at the same rate as the distance between the metalization on the stylus and the disc surface. Therefore, a signal recorded on the video disc, 5 MHz sinewave for instance, will cause the capacity between the electrode and the disc to vary at a 5 MHz rate. A typical capacity variation for a modulation depth of 850 Angstroms is approximately .0001 picofarads (10^{-4} pf). The varying capacity at the electrode is then applied via the flylead to the resonator circuit in the pick-up arm assembly.

Note that the diamond stylus is used only as a holding mechanism for the metalized electrode on the back of the stylus. The stylus itself does not pick up the video signal from the disc. Nor is it absolutely necessary for the stylus tip to be in mechanical contact with the disc. Signal will be retrieved even if the stylus leaves the disc surface momentarily.

The stylus electrode and the flylead are connected to one end of a tuned line in the resonator cavity. This tuned line is connected through a small capacity to the cathode of varactor diode D103 (Figure 25). The tuned line connected to the stylus flylead is driven by a 915 MHz oscillator circuit consisting of Q101, C104 C105, C106, C108 and L105. L103 and L104 are transmission lines.

The oscillator signal is supplied to the tuned line by transmission lines L104 and L103.

The tuned line, when connected to the stylus flylead, is resonant at 890 MHz. Therefore, the 896 MHz oscillator signal will occur on the trailing slope of the tuned line response curve as illustrated in Figure 24.

The varying capacity at the stylus electrode is coupled through the flylead to the tuned line. As the capacity changes it causes the center frequency of the tuned line to vary and results in amplitude changes in the 896 MHz oscillator signal coupled to L101 and to the diodes, D101, D102 and through C101. (Figure 25).

These diodes peak detect the amplitude modulation of the 896 MHz oscillator signal. The detected signal is filtered by capacitors C101 and C103. The resultant signal at the cathode of D102 is then applied to the base of Detector Buffer transistor Q102 to isolate or buffer the signal before amplification by the preamplifier circuit.

The resonant frequency of the stylus flylead tuned line is controlled by an AFT voltage which is coupled back from the preamplifier circuit.

The D.C. voltage from the AFT circuit is applied to the cathode of the varactor diode D103, tuning it to maintain the average center frequency. This ensures that the 896 MHz oscillator is always operating at the midpoint of the trailing slope of the 890 MHz tuned line. As a result, the amplitude modulation of the 896 MHz oscillator will be linear in both positive and negative directions. This prevents the tuned line center frequency from shifting due to changes in stray capacity at the stylus, thus causing a non-linear amplitude modulated signal at the output of the detector.

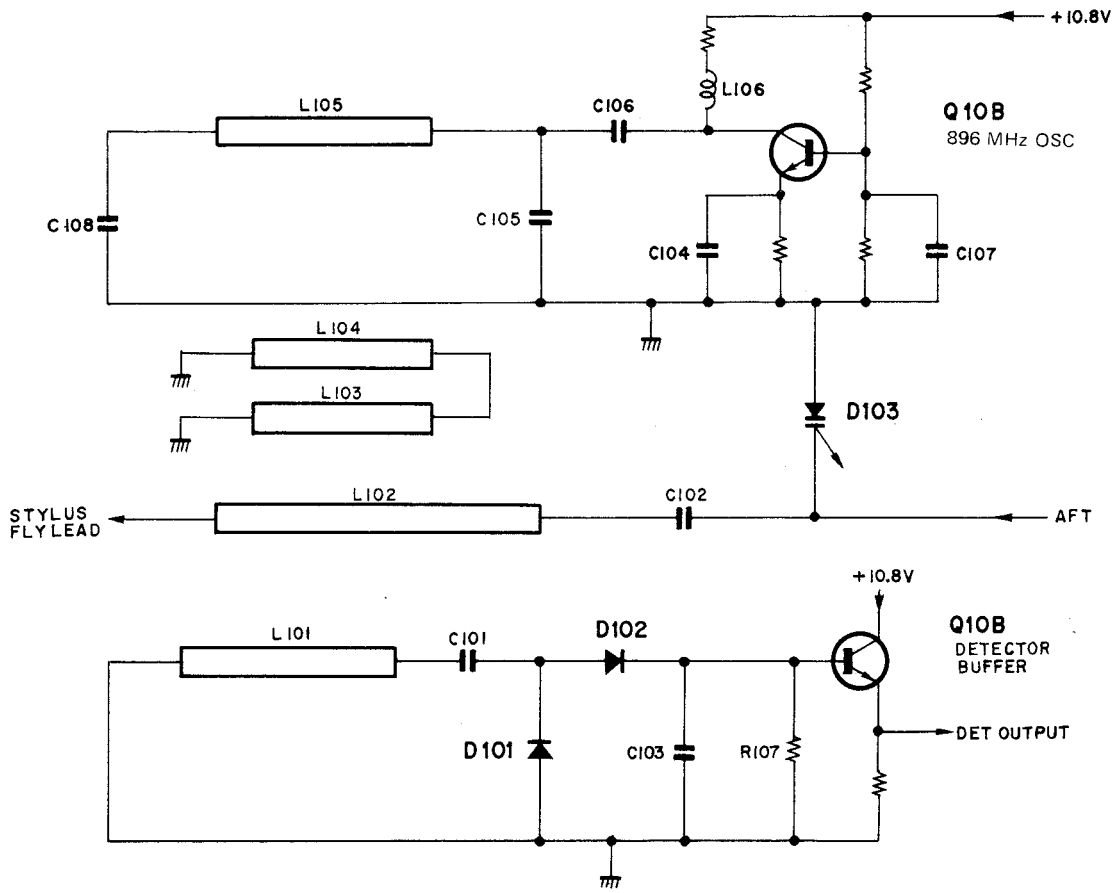


Figure 25. 896 MHz Resonator and Detector Circuit.

2. AUDIO SIGNAL PROCESSING

2.1. GENERAL

This player is capable of playing the new Stereo or Bilingual (Dual Sound) Discs while maintaining compatibility with Mono Discs.

The player feeds audio signals to the Audio Out (for a stereo amp.) jack and to the RF modulator.

The full spectrum of audio information, 30 Hz to 15 kHz is supplied from the VDP which is capable of reproducing monaural, stereo or dual sound from the appropriate Video Discs.

Disc Detection (Mono, Stereo, Bilingual) is accomplished by decoding the Daxi Code which is recorded in the disc and selection is performed automatically.

Mono discs have a single audio carrier at 711 kHz. Stereo and Independent discs have two audio carriers, one at 711 kHz and the other at 898 kHz.

On stereo discs the FM 711 kHz carrier is recorded after being modulated with the addition of Left and Right audio signals (L+R). The FM 898 kHz carrier is recorded after being modulated with the subtraction of Left and Right audio signals (L−R). In addition, stereo discs are encoded with CX noise reduction which enables the audio dynamic range to be improved by 20 dB as compared to Mono discs.

On independent discs, FM 711 kHz is modulated with channel 1 (main) and FM 898 kHz is modulated with channel 2 (Sub) audio signals.

The arm output signal contains several signals including Video and Audio FM carriers. Only the FM Audio carriers pass through the 711 kHz and 898 kHz Band Pass Filters. These are detected by the PLL FM detectors in IC201 and IC202. The detected signals are fed to the Stereo Matrix, Mode Selector and DOC. The Mode Selector chooses the proper audio signals for the disc being played by the control signals from the Microprocessor. Impulse noise is removed by the DOC. The signals are fed to the Variable Gain Amplifier or Noise Reduction Circuit. Finally the output audio is fed to the RF Modulator and to the audio output jacks.

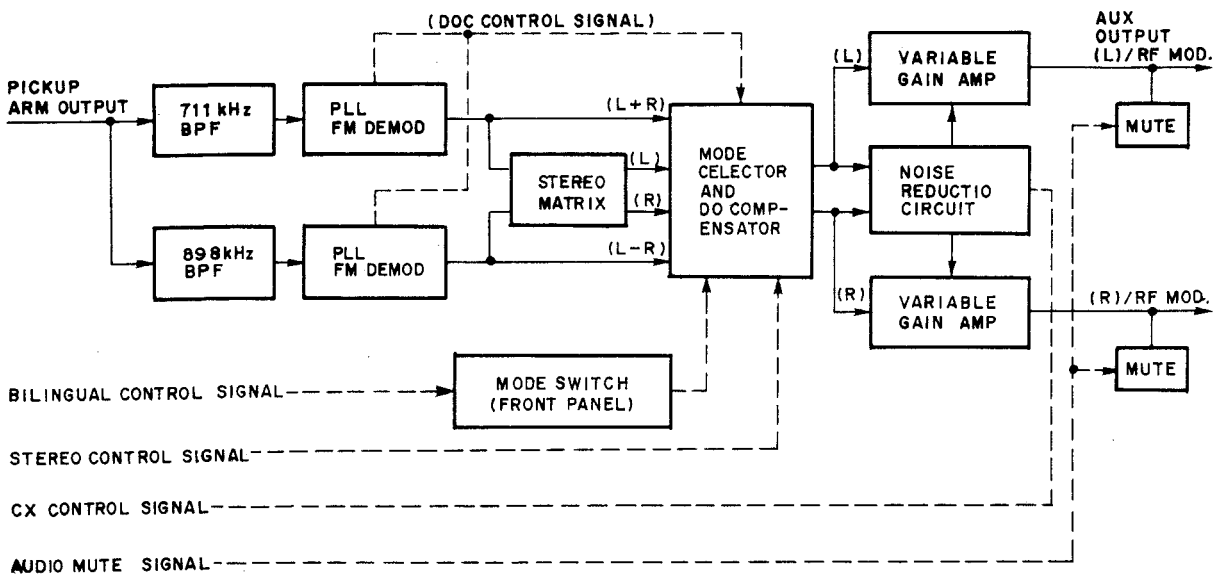


Figure 26. Audio Signal Processing Simplified Block Diagram

MICRO COMPUTER		AT NORMAL PLAY					
PIN	STATUS	MONO	STEREO	CX	MAIN	SUB	AT MUTE
31	BILINGUAL	5V	5V	5V	0V	0V	Do not care
32	MONO	5V	0V	Do not care	0V	5V	Do not care
34	CX	Do not care	Do not care	5V	0V	0V	Do not care
33	AUDIO MUTE	5V	5V	5V	5V	5V	0V
34	VIDEO MUTE	5V	5V	5V	5V	5V	0V

Table 1. Control signal VS. disc

2.2. AUDIO FM DETECTOR

(1) 711 kHz FM Detector (MONO/L+R/MAIN)

After passing through the 711 kHz BPF, the sound carrier is applied to pin③of IC201. The limiter removes amplitude variations in the carrier signal. The amplitude limited carrier becomes one of two inputs to the phase lock loop detector. The other input is a 711 kHz reference signal generated by a VCO. The detector error signal is filtered by the net work connected to pins ⑤ and ⑥ of IC201. The VCO tracks the frequency deviation of the FM carrier which of course is audio modulation. The signal is further filtered which of course is audio modulation. The signal is further filtered by a Low Pass Filter at pin ⑦. The signal re-enters IC201 at pin ⑨, is amplified and output at pin ⑪.

The output of the limiter is also connected to a defect detector. The carrier signal is compared with the 711 kHz VCO and generates a negative pulse at pin ⑬ whenever a defect in the carrier signal is detected.

(2) 898 kHz FM Detector (L−R/SUB)

After passing through the 905 kHz BPF, the sound carrier is applied to pin③of IC202. The functions of IC202 are identical to those of IC201 except the treated frequency is 898 kHz, and negative feedback between pin ⑨ and ⑪ through R230 is adjustable for audio separation.

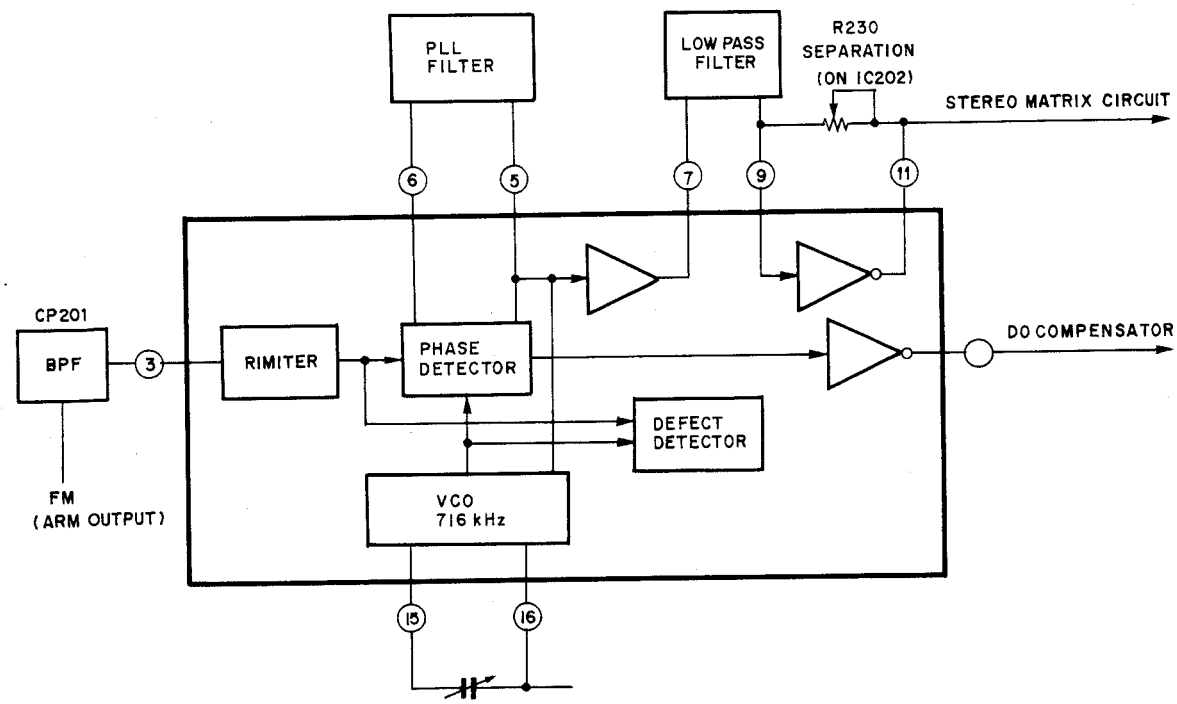


Figure 27. Audio Demodulator Operation

2.3. MODE SELECTOR AND DROP OUT COMPENSATOR

The 4 output signals of the Stereo Matrix are fed to IC204. L+R to pins ①, ⑪, ⑫ and ④. L−R to pins ⑮ and ②. L to pin ⑭ and R to pin ⑤. The control signals of Disc Detection from the microcomputer IC701 are also fed to IC204. Stereo Control Signal to pin ⑩ and Independent Control Signal to pin ⑨. The D.O. control signals from IC201 and IC202 are fed to Q202 and Q203. They are mixed, waveshaped and fed to pin ⑥ of IC204. During dropout, the negative pulse from pin ⑬ of IC201 is fed to the base of Q203, cutting it off and pin ⑥-IC204 becomes high. The audio signals at pins ⑬ and ③ of IC204 are held at their previous levels by C244 and C245. If the negative dropout pulse appears at pin ⑬-IC202, it is fed to the emitter of Q202. If the Stereo Control Signal or Independent Control Signal is being received. D201 or D202 conducts and Q202 is turned on. Q203 is off pin ⑥-IC206 is high and pins ⑬ and ③-IC206 are held as previously described.

The outputs at pins ⑬ and ③ of IC206 are determined by the signals at pins ⑥, ⑨ and ⑩. The truth table of figure 28 explains the relationship.

IC 206 Truth Table

CONTROL INPUT			"ON" CHANNEL	"OUTPUT" MODE
6 PIN	9 PIN	10 PIN		
L	L	L	X_0, Y_0	MONAURAL
L	L	H	X_1, Y_1	STEREO
L	H	L	X_2, Y_2	SUB
L	H	H	X_3, Y_3	MAIN
H	L or H	L or H	NONE	NONE

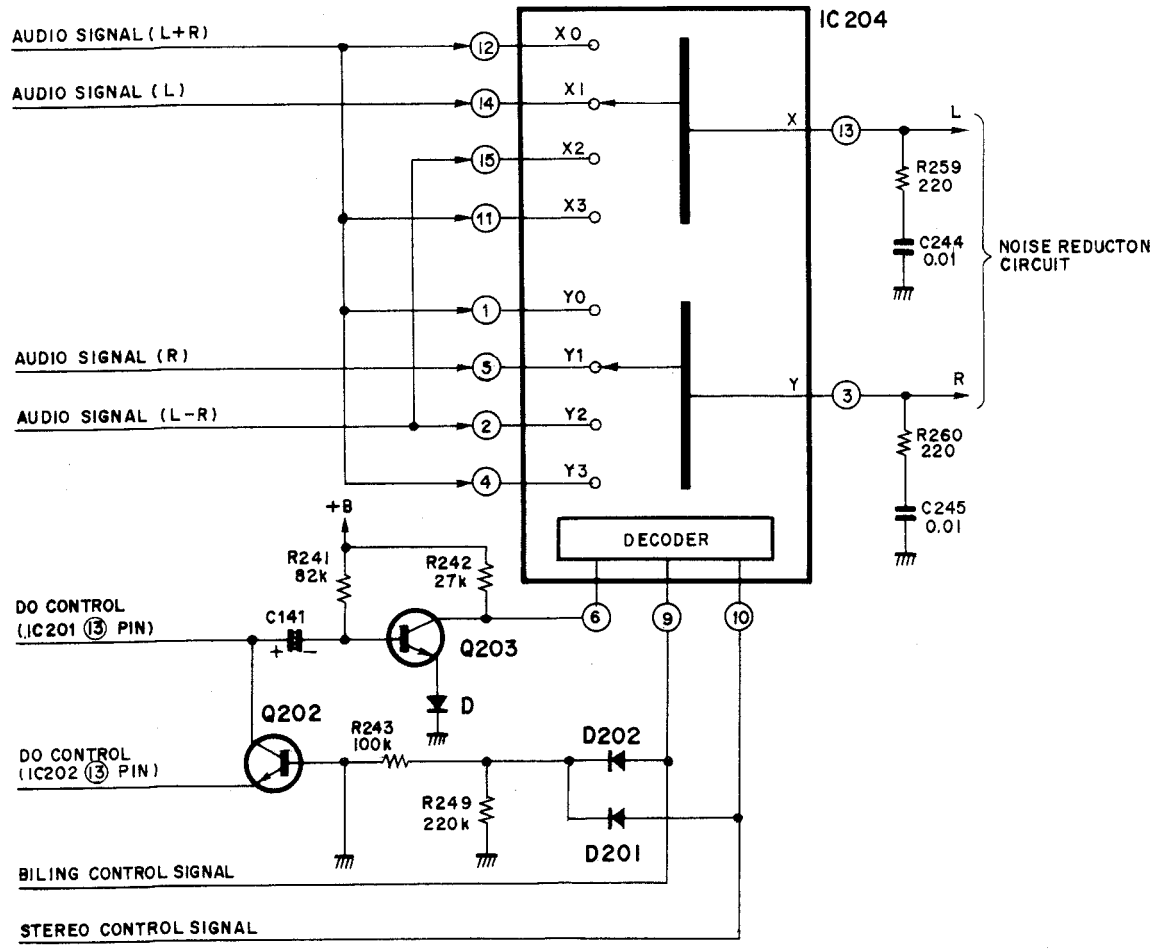


Figure 28. Mode selector and drop out compensator circuit

2.4. CX-NOISE REDUCTION EXPANDER

The CX-Noise Reduction Expander is housed in one chip of IC205. The outputs (R, L) from mode selector are fed to pin ⑩ and ⑪ of IC205 through R261, 262 and amplified and fed to variable gain amplifier. This is the audio signal path.

Control signal of this variable gain amplifier is obtained from the third pass, in which adder and envelope detector, input cell, output cells with time constant network and CX enable circuits are incorporated.

Input cell has two time constants of attack time (1 m sec, R1-C260) and release time (10 m sec, R2-C260).

Output cell is consisted from 4 time constant network, which are a linear (2 sec, R275-C259), a charge (30 m sec, R3-C259), a discharge (200 m sec, R4-C259) and a hipass filter (30 m sec, R273, 274-C258).

CX-enable is made by the CX control signal from microcomputer IC701.

So the compressed CX-encosed audio signal recorded on the disc, is detected by this third path and now expanded to original audio signal by the variable gain amplifier with the help of control signal.

This compress and expand is made 20 dB and tapered between 0 dB and 40 dB, the dynamic range or signal noise ratio is improved by 20 dB and compatibility is also reserved. (Figure 30).

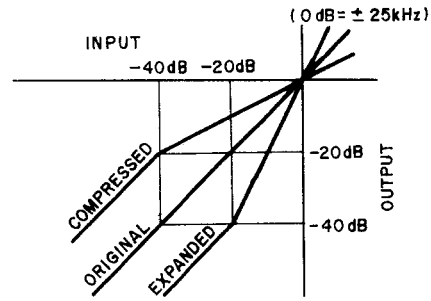


Figure 30.

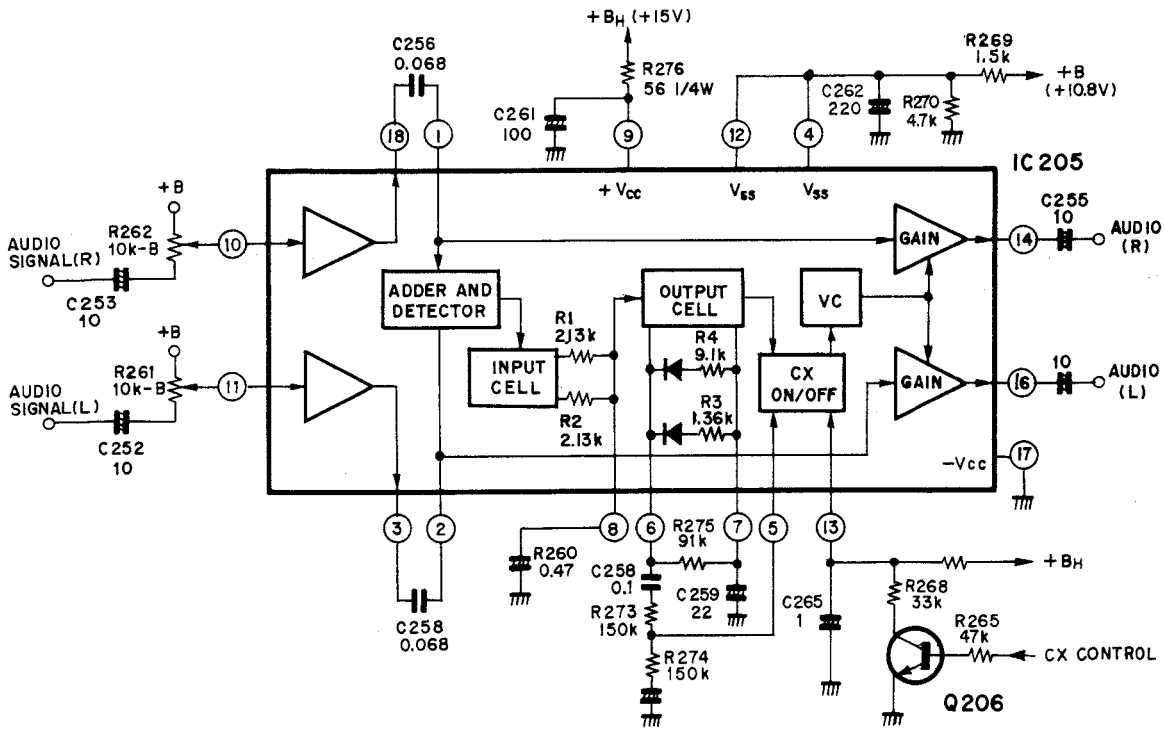


Figure 29. CX-Noise Reduction Expander

3. VIDEO SIGNAL PROCESSING

3.1. VIDEO SIGNAL PROCESSING

The output signal from the pickup arm assembly contains two different signals. The FM video carrier signal and the FM audio carrier signal.

During pickup of the disc carrier signals, the relatively low frequency 711 kHz sound carrier signal causes modulation of the spacing between the stylus and the signal on the disc. This low frequency modulation, in turn, causes phase modulation of the video carrier at a 711 kHz rate. The resulting phase modulation of the video carrier can cause an undesirable 711 kHz visual beat or "sound beat" to occur in the video picture. The effect of sound carrier phase modulation of the arm output signal is eliminated by the operation of the Nonlinear Aperture Correction (NLAC) circuit. The NLAC circuit, utilizing a nonlinear amplifier, separates the sound beat information, phase inverts it and adds it to the original signal, thus, in effect, cancelling the sound beat signal in the video FM signal.

After being processed by the NLAC circuit, the video FM carrier is applied to the video demodulator circuitry via a 1.5 to 9 MHz bandpass filter network. In the video demodulator IC, the FM video carrier is demodulated to develop the composite video signal which is coupled to the comb filter circuitry.

The dropout output from the dropout detector is activated when a dropout in the video carrier is detected. The dropout detection circuit output is applied to the comb filter. The comb filter automatically inserts the corresponding portion of the previous horizontal line of information into the output signal when a dropout is detected.

By doing this, momentary dropouts in the video carrier are not displayed as noise impulses in the picture on the television receiver, instead, the previous horizontal line is displayed. The circuitry is capable of repeating up to 3 horizontal lines (with color information) before any degradation in the signal is noticeable.

The primary function of the comb filter circuit is to separate the chrominance and luminance signals. Efficient chrominance/luminance separation capability is necessary because of the utilization of a "buried" subcarrier chrominance system. In the "buried" subcarrier system, the chrominance information is placed at a subcarrier frequency of 1.53 MHz, which is approximately at the midpoint of the luminance bandpass. The chrominance information, however, is frequency interleaved with the luminance, hence, the energy content of the chrominance signal is spaced at ½ the horizontal deflection rate difference from the luminance signals. Therefore, a comb filter circuit can be utilized to effectively separate the luminance and chrominance signals.

Because of the wide bandwidth of the CCD (Charged Coupled Device) delay line, the combed chrominance information also contains low frequency luminance information. This information is lowpass filtered and added to the luminance signal to provide a completely combed luminance output.

The DAXI signal, which is recorded on line 20/333 of each vertical field, is processed as a chrominance signal because it is low frequency information and nonrepetitive from one horizontal line to the next. Therefore, it will appear in the vertical detail signal which is derived from the low frequency combed chrominance output. A lowpass filter network separates the vertical detail information from the chrominance information and provides a separate output to the system control circuitry containing DAXI code information.

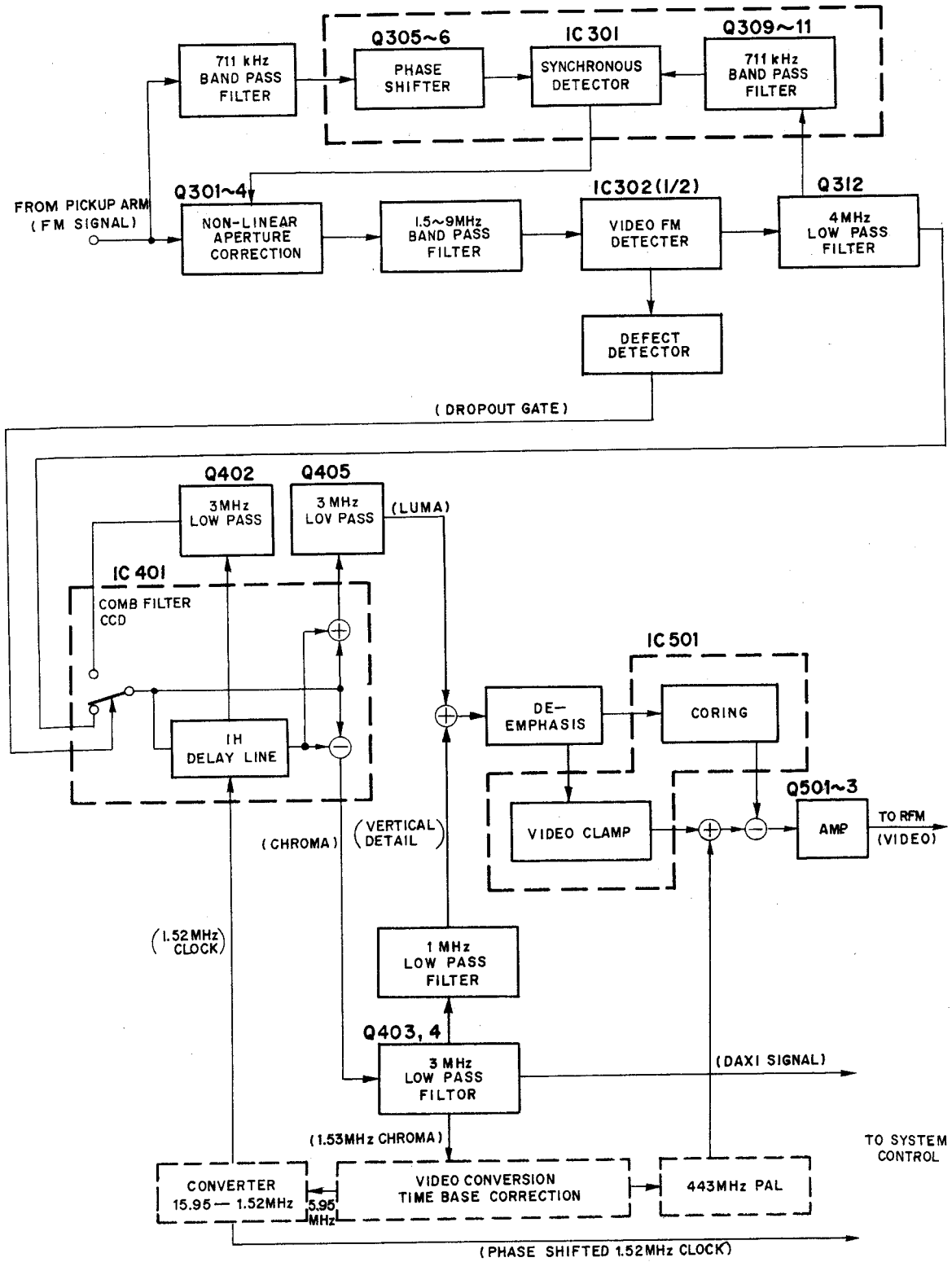


Figure 31. Video signal Processing.

4. VIDEO CONVERSION/TIME-BASE CORRECTION

4.1. VIDEO CONVERTER, and PAL (APC)

The video signal recorded on the video disc utilizes a "buried" subcarrier color signal, the chroma subcarrier frequency being at 1.523412 MHz. To display signals from a video disc on a standard television receiver, it is necessary to up-convert the color subcarrier frequency to the PAL standard 4.43 MHz subcarrier frequency. This is accomplished in the video converter circuitry. The video converter also combines the luminance and up-converted chrominance signals to provide composite video which is modulated onto a RF carrier to provide the channel 32 to channel 40 RF output to a television receiver.

In addition to developing the composite video with a 4.43 MHz chroma subcarrier frequency, the video converter also provides color and luminance time-base correction. As the disc is rotating and signals are being picked up by the stylus, small warps or eccentricities in the disc will cause a modulation of the velocity at which the grooves pass under the stylus. The differences in velocity cause variations (time-bass errors) in the luminance and the chrominance subcarrier frequencies. These variations, if not corrected, would generate varying tint and color, and horizontal instability in the displayed video information. To correct this problem, a closed phase lock loop circuit appropriately alters the phase of a 5.95 MHz VCXO. This oscillator is chromiannce, thus the correcting phase alterations remove any velocity caused time-base errors in the converted 4.43 MHz chrominance ("chroma" or "chrominance" refers to the color subcarrier frequency and/or sidebands centered about it.) The phase lock loop output also corrects for luminance frequency variations caused by changes in velocity between the stylus and disc grooves. Luminance velocity correction is accomplished only by the jitter compensator circuit which maintains a constant stylus-to-disc velocity by moving the stylus along the disc groove.

An overall block diagram of the video converter and PAL circuit is shown in Figure 32. The 1.52 MHz chroma signal is first heterodyned with the 5.95 MHz VCXO. The refult generates a 4.43 MHz chroma signal which is filtered and applied to a phase after network in which obtained 4.43 MHz chroma is phase altered by line, compling with PAL Standard signal. Phase alterted colour (PAL) signal is fed to summing network in which luminance information is added to it. The output of the summing network contains composite video with 4.43 MHz chroma information. The 5.95 MHz VCXO is also heterodyned with a 4.433619 MHz crystal reference oscillator. This action generates a 1.52 MHz clock signal which drives the system control and comb filter circuits. The 4.433619 MHz crystal oscillator output

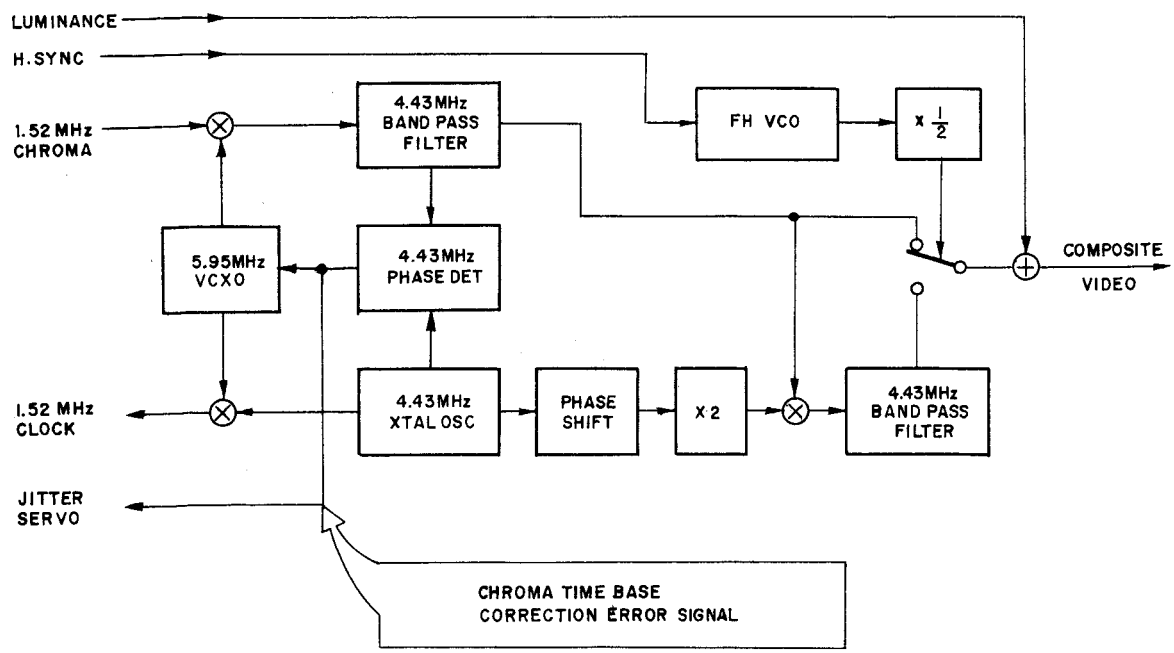


Figure 32. Converter and PAL Block Diagram

is also applied to one input of a phase detector, which compares the phase of the reference oscillator to that of the up-converted 4.43 MHz chroma information. The output of the phase detector is then coupled to two frequency selective parallel paths. One path is to the 5.95 MHz VCXO, which modulates the frequency and phase of the oscillator. A second path is to the jitter compensator, which modulates the velocity between the stylus and disc. Third output of 4.433619 MHz crystal oscillator output is phase shifted, doubled and mixed with above obtained corrected 4.43 MHz chroma signal.

Thus the 4.43 MHz chroma signal is phase converted respect to V axis and the residual spurious is filtered out at 4.43 MHz bandpass filter, consequently (-V, +V) signal is applied to one input of electronic switch.

The 4.43 MHz chroma signal (+V, +V) is also fed to another input of the switch..

This electronic switch is controlled by the fh/2 pulse, derived by PLL circuit triggered by playback H. sync, and the PAL chroma signal is obtained at the output of the switch.

4.2. TIME-BASE CORRECTION (JITTER SERVO)

Jitter Compensator Small deviations in the velocity of the video disc with respect to the stylus cause phase and frequency deviations in the recovered luminance and 1.52 MHz buried subcarrier chrominance signals. Uncorrected, these phase and frequency changes will, when up-converted to 4.43 MHz PAL color standard, cause tint and color deviations to occur in the displayed video picture. Variations in the luminance phase and frequency would cause the displayed picture to exhibit horizontal instability. These errors can be caused by either small amounts of warp in the video disc or by disc eccentricty, i.e. the hole in the center. Thus, as the disc rotates, the distance from the center of the disc not being exactly in the geometrical center to the stylus will change,causing velocity varications, i.e. time-base errors.

The "Jitter compensator" system provides a portion of the necessary correction of these time-base errors. If the disc is warped or slightly eccentric, the result will be a change in the velocity at which the grooves pass under the pickup stylus. This causes an undesired FM modulation of the carrier picked up the stylus. The arm output signal is applied to the signal circuits, where, as a result of the changing velocity, the phase and frequency of the 1.52 MHz chroma as well as other signal vary. Changes in phase and frequency of the luminance information will cause jitter. Extremely small phase and frequency changes in the chroma subcarrier will be evidenced as tint and color errors in the displayed picture. Errors inthe phase and frequency of the luminance signal are prevented from occurring by operation of the jitter compensator circuit which corrects for velocity errors due to disc eccentricity or warpage.

The jitter compensator circuitry is driven by an error signal which is developed by a phsse detector. This detector compares the up-converted 4.43 MHz chrominance signal and the 4.433619 MHz crystal reference oscillator, generating an error signal proportional to the phase difference between these two sources.

The detector output voltage is then applied both to the jitter compensator circuit and the 5.95 MHz VCXO, through frequency selective paths, to correct for the phase and frequency errors.

Two time base correction means are necessary to provide adequate correction for all of the types of error causes encounted. One source of error, which is essentially a static or DC error, is caused by the difference in velocity of disc between record mode and play back mode. Therefore, all signals picked up by the stylus will be slightly lower or higher in frequency. These errors, which lie in the frequency range of DC, are corrected by adjusting the average frequency of the 5.95 MHz VCXO. So the average frequency of the player chrominance output is always 4.4336 MHz.

The second type of error which requires correction of both lumiance and chrominance information, occurs in the mid frequency band between 1 and 300 Hz. This error is caused by disc eccentricity or warp which modulates the disc to stylus velocity at the disc revolution rate. Error signals of this type are corrected by the jitter compensator. This device forces the stylus to increase or decrease in velocity along the video disc groove maintaing a constant relative stylus-to-groove velocity.

The third type of error signal, for which only the chrominance signal needs correction, is in the high frequency band above 300 Hz. Error signals of this type can be caused by excessive disc warp or by small distrotions in the surface of the disc. This error is corrected by appropriately phase modulating the 5.95 MHz VCXO.

The jitter compensator and chrominance time-base correction circuit utilizes a pahse lock loop configuration. The error signal is generated by comparing the up-converted chrominance signal with a 4.43 MHz reference signal.

5. ARM SERVO SYSTEM

5.1 ARM SERVO SYSTEM

In an audio record system, the lateral force applied to the stylus by the grooves on the disc is sufficient to cause the tone arm to follow the stylus across the radius of the disc. In a Video Disc, however, the lateral force on the stylus is much smaller. Therefore, a DC motor is utilized to move the pickup arm assembly across the radius of the disc, providing proper tracking of the stylus. The DC motor which drives the pickup arm must be operated so the stylus position remains in the center of the pickup arm assembly. This is accomplished through the use of a servo control system which drives the pick-up arm assembly.

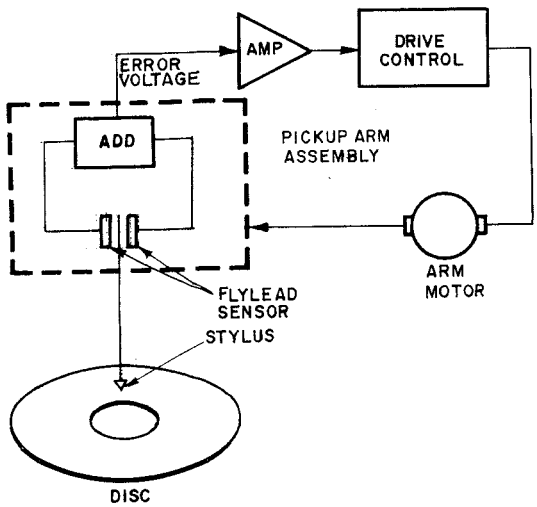


Figure 33. Arm Servo System

As shown in Figure 33, the servo system in the Video Disc Player generates an error signal from adding two Flylead sensor signals which detect the flylead sensors output. The flylead sensors are located on either side of the stylus flylead as described in Figure 34.

If the stylus is centered, equal amounts of signal will be picked up by each flylead sensor. As the flylead moves to the inside direction of the disc the adder circuit will produce an error signal. If the flylead moves toward the outside of the disc, the error signal will be negative.

The arm motor is controlled by this error signal through a drive control, which, in turn, controls the position of the pickup arm assembly with respect to the stylus.

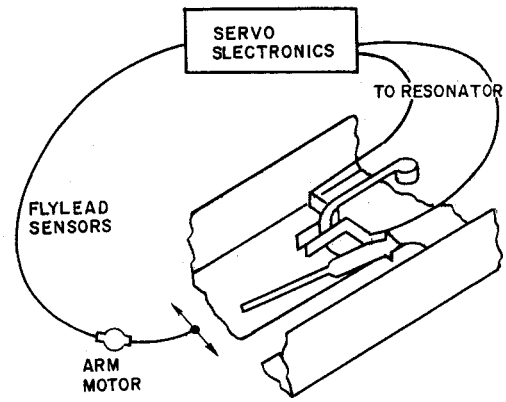


Figure 34. Stylus Flylead Relationship

When the stylus is in the center of the flylead sensors, the error signal will be zero. However as the stylus moves closer to one of the flylead sensors due to lateral force of the groove of the stylus, the error signal will be increased, and then causes the arm motor to move the pickup arm assembly to center the stylus.

Therefore as the stylus is moved across the video disc by the force of the grooves of the stylus, the pickup arm assembly is in turn moved across the radius of the disc by the arm motor which is controlled by the amount of error signal picked up on the flylead sensors.

5.2. ERROR SIGNAL GENERATION

The flylead composes a part of the 896 MHz resonance circuit, so that it may pickup the signals of the disc. Therefore, the 896 MHz alternating voltage is induced on the flylead and on the flylead sensor the voltage is induced according to the position of the flylead (it increases when the flylead goes away).

The ouput voltage of the inside flylead sensor C136 is rectified and doubled by D105 and D108. (inside flylead sensor). Similarly the output voltage of the outside stylus sensor C137 is rectified negatively to wtice the voltage on the reference by D106, D107 (outside flylead sensor).

The output voltages of each flylead sensors are added by R127, R128, R129, and the output voltage is derived from the variable resister of R129.

The difference between the output voltage and the reference voltage becomes the error signal.

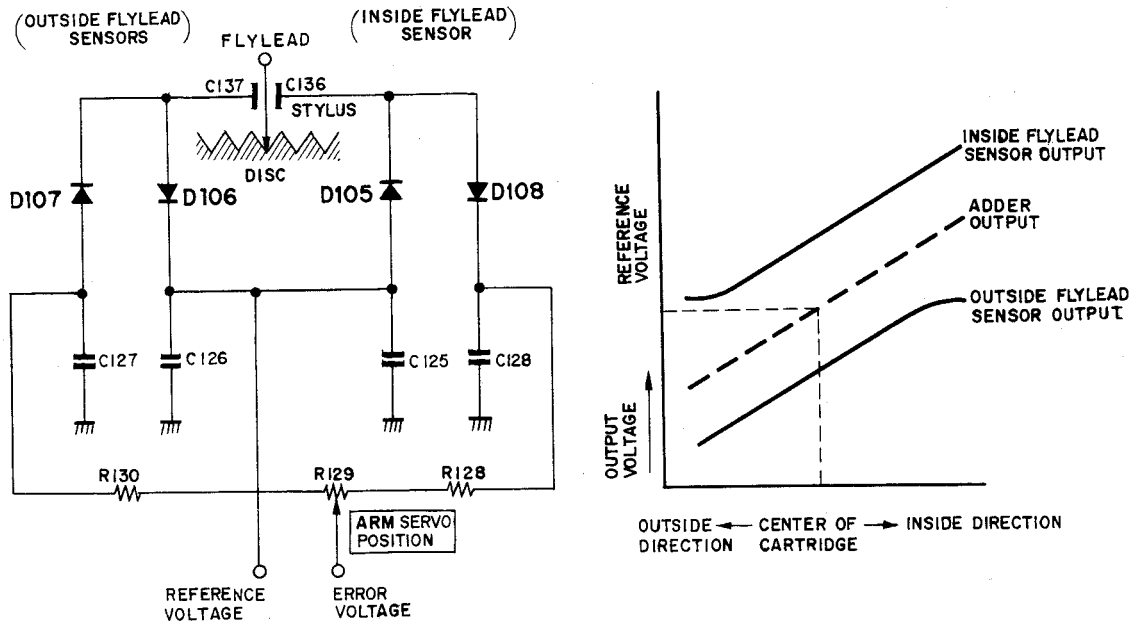


Figure 35. Relation between the Voltage and the Position of the Stylus.

Figure 35 shows the relation between the output voltage and the position of the stylus. Adjustment of R129 (Arm Servo Position) determines the controlling position of the stylus.

6. DISC DRIVE MOTOR

DISC DRIVE MOTOR (TURNTABLE MOTOR)

The turntable motor is required to turn the turntable precisely at 450 rpm (7.5 turns/sec.). Drift of speed, and wow and flutter appears as drift of raster sync and drift of color sync. A 3-phase flat non-rectifier DC servo motor is used to direct-drive the turntable. (Correct rotation can be obtained with no relation to the power frequency).

It is designed so that the rotor magnet is divided into 8 poles; this rotor is attached directly tothe turntable and rotates by the electromagnetic force with 3 paris of stator coils. A PC Board is provided a little apart from the motor; the printed coil which generates frequency by means of the rotor revolution and 3 Hall elements generate the 3-phase drive current.

7. SYSTEM CONTROL

The player operational mode and status is monitored and sequentially controlled by the system control.
This system control is consisted with the one-chip micro computer, the Digital Butterh, and their surrounding circuits.

7.1. MICROCOMPUTER

Total operation of the player is controlled by one-chip microcomputer IC 701, and its capability is as follows.

- Structure . . . . . 8 bit
- Memory . . . . . 96 Byte (RAM), 3834 Byte (ROM)
- Timer 1, 2 . . . . . 8 bit with 7 bit prescater
- Inturrupt . . . . . External x 2, Timer x 4
- A/D connecter . . . . 8 bit 4 channel

The A/D converter serves the arm servo error signal, the front button, the motor drving current and photo coupler detection.
The main input, output pin of microcomputer is shown in Table 2 , at each mode.

PIN	STATUS	STANDBY	LEAD IN	PLAY	RETURN	NOTE (pluse duty)
3	INT	H	H	⊓⊓⊓	H	20 msec.
14	REMOTE	Unit operation	⊓⊓⊓ ⊓⊓⊓	Non-operation: H		0.25 ~ 2 msec.
13	DDM	H	⊓⊓⊓	⊓⊓⊓	H	40 msec.
15	KEY	⊓⊓⊓	⊓⊓⊓	⊓⊓⊓	⊓⊓⊓	2 msec.
28	LIFTER	L	L	H	L	
29	PU LAMP	2V	2V	2V	2V	
30	AUDIO MUTE	L	L	H	L	
33	VIDEO MUTE	L	L	H	L	

Table 2 Operational status map

7.2. DAXI (Digital Auxirialy Digital Information)

Digital information (DAXI) is recordexd in line 20/332 at each vertical interval, the DAXI code contains information that identifies each field, band, disc type, start code and check code. (Figure 36). The DAXI code is processed in DAXI Buffer (IC702) and valid code is transfered to micro-computer.

- Normal paly monitor – To monitor if the stylus/ Cartridge is tracking correctly by detecting field number.
- Locked groove detection and compensation – To detect the stylus tracking irregularlity and compensate. The Digital Buffer transfer DAXI code to the micro-computer, which compares it with the previous field number, if the comparison indicates that the stylus has kicked back one or more grroves, the microcomputer will activate the kick outputs causing the stylus to be kicked forward.
- Visual search monitor – To monitor if the stylus/ cartridge is reguraly kicked forward and check the correct speed visual search status.
- Disc type detection – To detect MONO/STEREO/ BILINGUAL type.

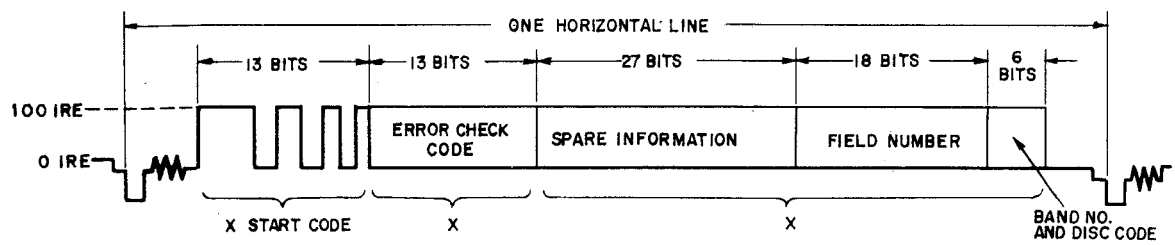
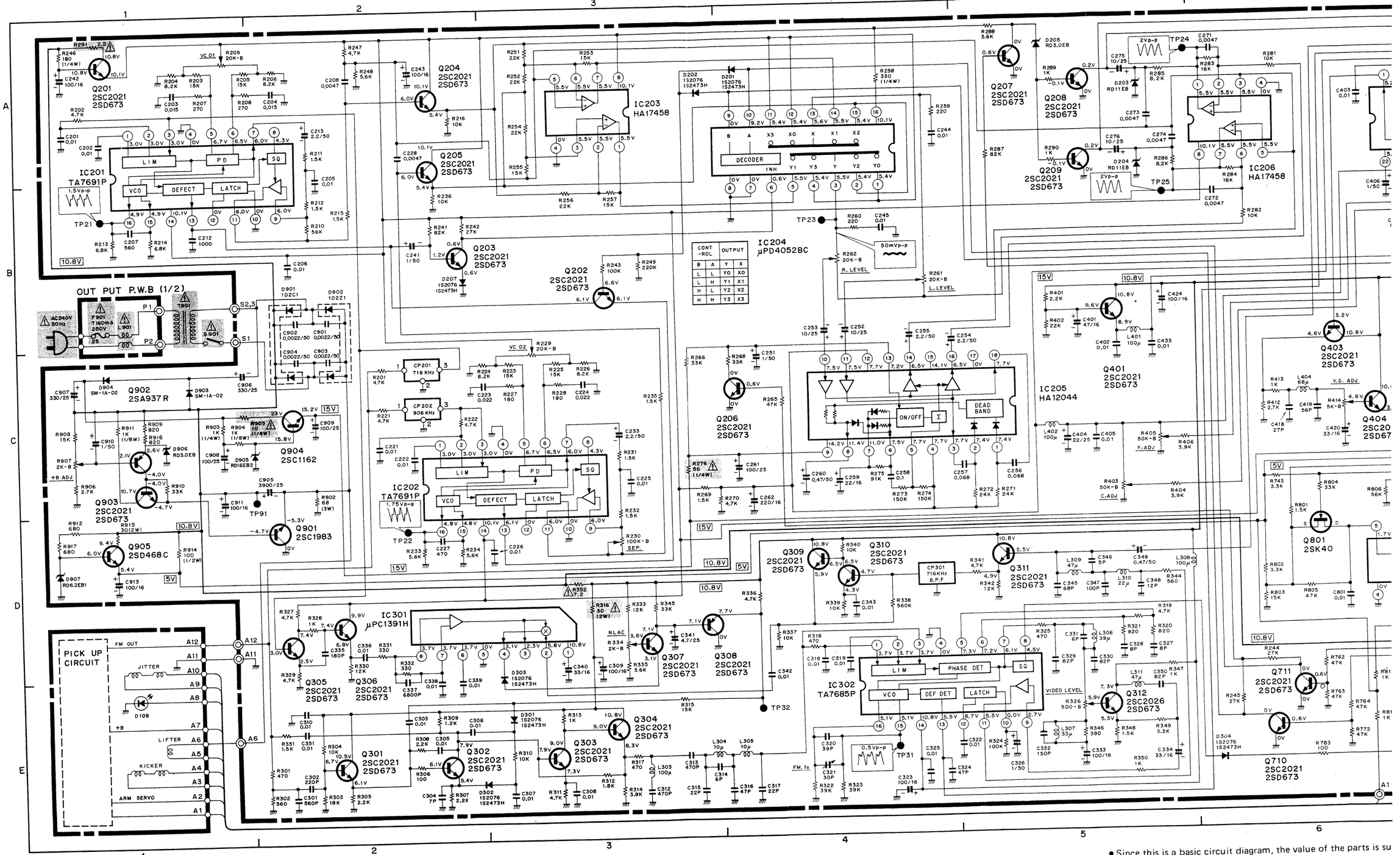


Figure 36. Daxi Code on Line 20/332

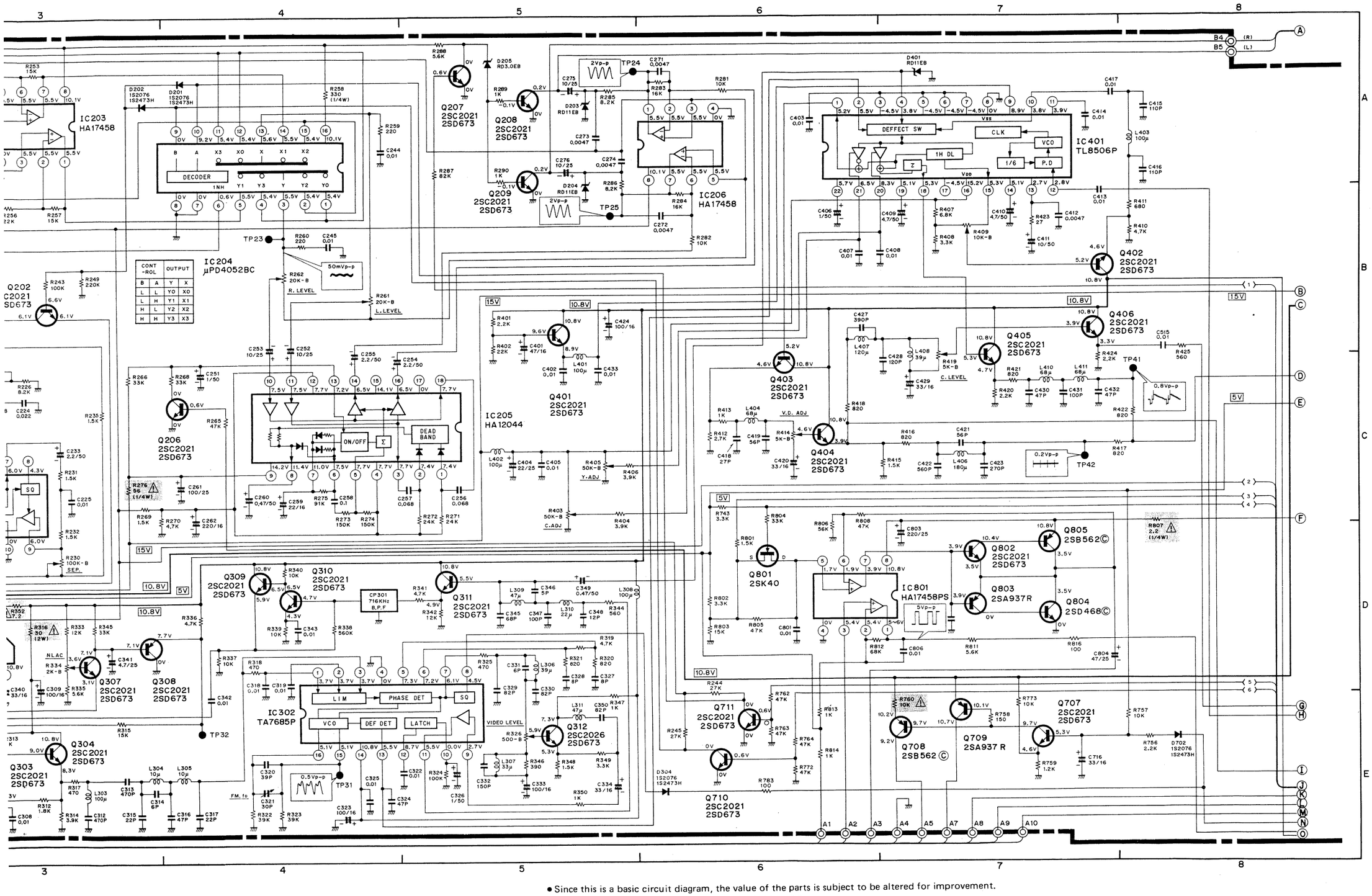
CIRCUIT DIAGRAM SECTION A



- Since this is a basic circuit diagram, the value of the parts is su
- All DC voltage to be measured with a tester (100kΩ/V).
  Voltage taken on a complex color bar signal including a standa

CIRCUIT DIAGRAM SECTION A

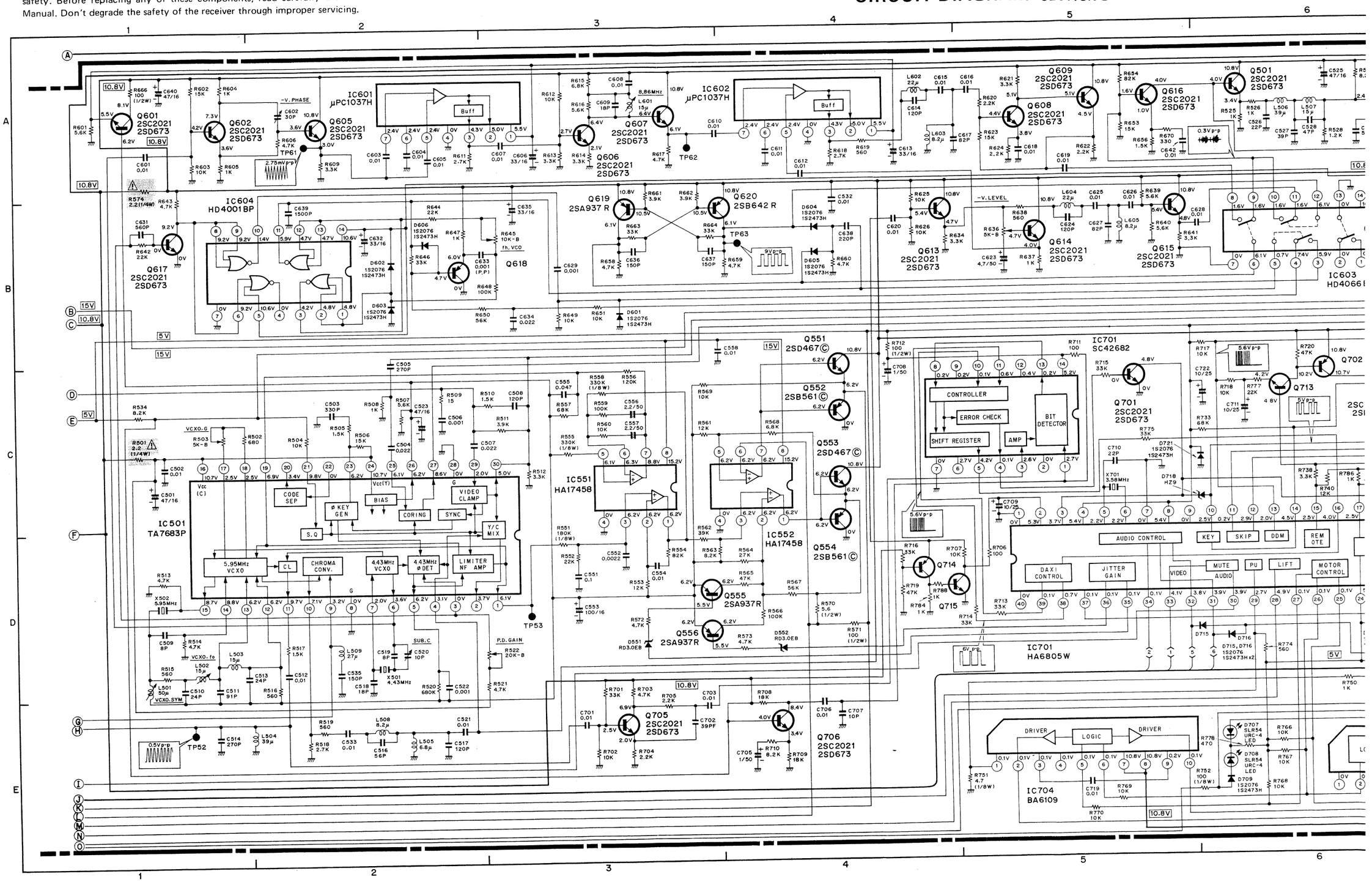
PRODUCT SAFETY NOTE: Components market with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.



- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.
- All DC voltage to be measured with a tester (100kΩ/V).
  Voltage taken on a complex color bar signal including a standard color bar signal.

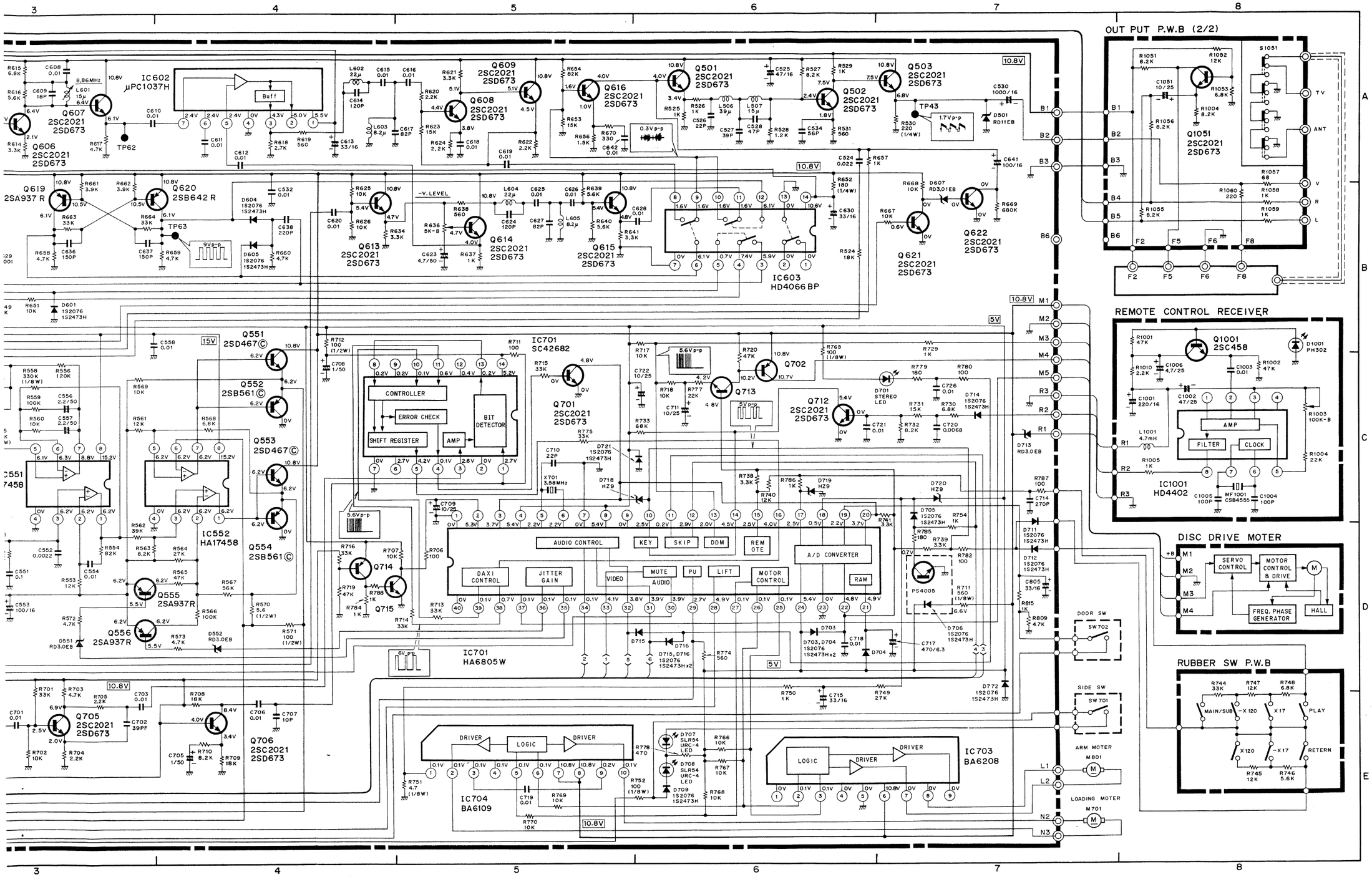
PRODUCT SAFETY NOTE: Components market with a ⚠ and shaded have special characteristics important to safety. Before replacing any of these components, read carefully the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

CIRCUIT DIAGRAM SECTION B



- Since this is a basic circuit diagram, the value of the parts is subject to be altered for improvement.
- All DC voltage to be measured with a tester (100kΩ/V).
  Voltage taken on a complex color bar signal including a standard color bar signal.

CIRCUIT DIAGRAM SECTION B

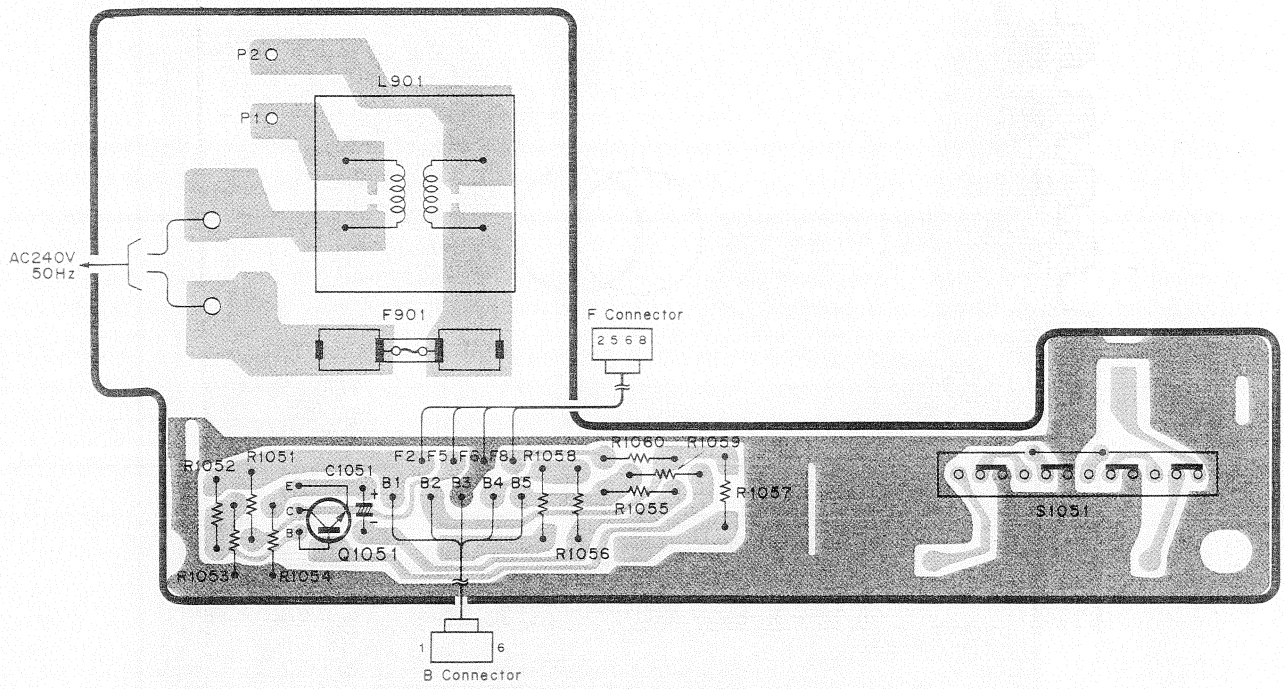


1e parts is subject to be altered for improvement.
:Ω/V).
ding a standard color bar signal.

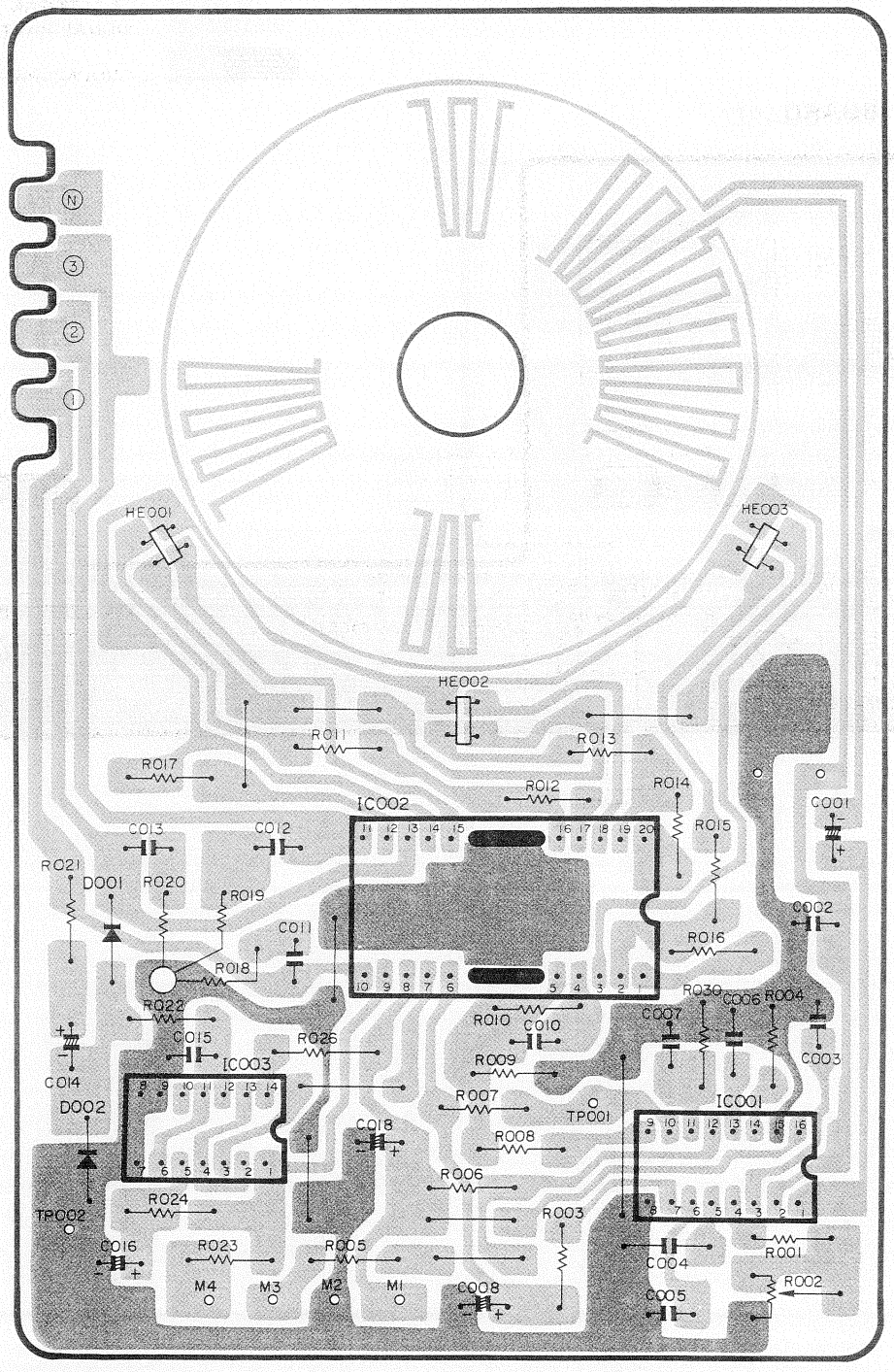
PRINTED WIRING BOARD

..... +B PATTERN
..... SIGNAL PATTERN
..... GROUND PATTERN

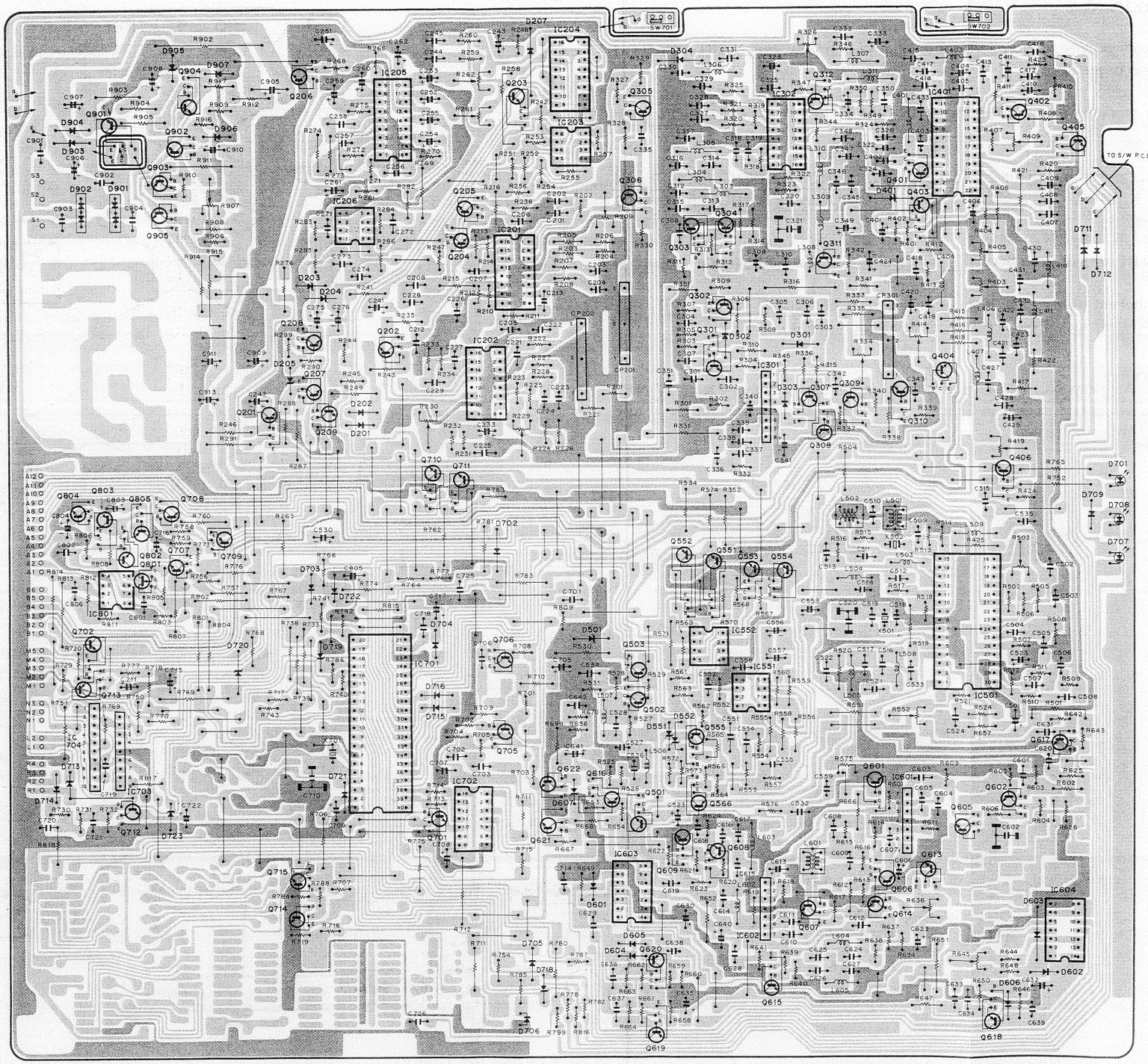
OUTPUT P.W. BOARD



MOTOR P.W. BOARD



MAIN P.W. BOARD



TROUBLESHOOTING

HOW TO USE THIS TROUBLESHOOTING;

STEP 1. If the Player will not produce any picture and sound, please follow the MAIN CHART I (NO OPERATION) on page 48.

STEP 2. If the Player will not operate properly, please follow the MAIN CHART II (MAL FUNCTION) on page 54.

STEP 3. If the Player will not produce proper sound either from STEREO or INDEPENDENT (Dual) Sound Discs, please follow the MAIN CHART III (MONAURAL SOUND OK BUT IMPROPER STEREO SOUND) on page 60.

STEP 4. If you come to the SUB CHART, described as NO ( ), please see the corresponding pages.

STEP 5. If you come across the component or assembly block enclosed with rectangle [ ], that shows the suspected component or block. Please check and replace, if necessary.

CAUTION:
Check the dressing of particular parts on the Main printed circuit board as listed in Figure 37 after repairing. Re-style the suspected parts as shown in Figure 37, otherwise wrong placement may cause the part to block the pickup arm from moving.

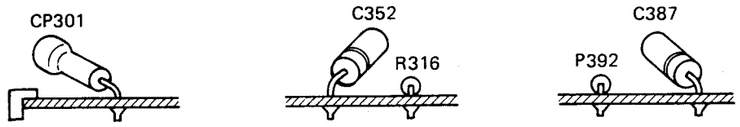
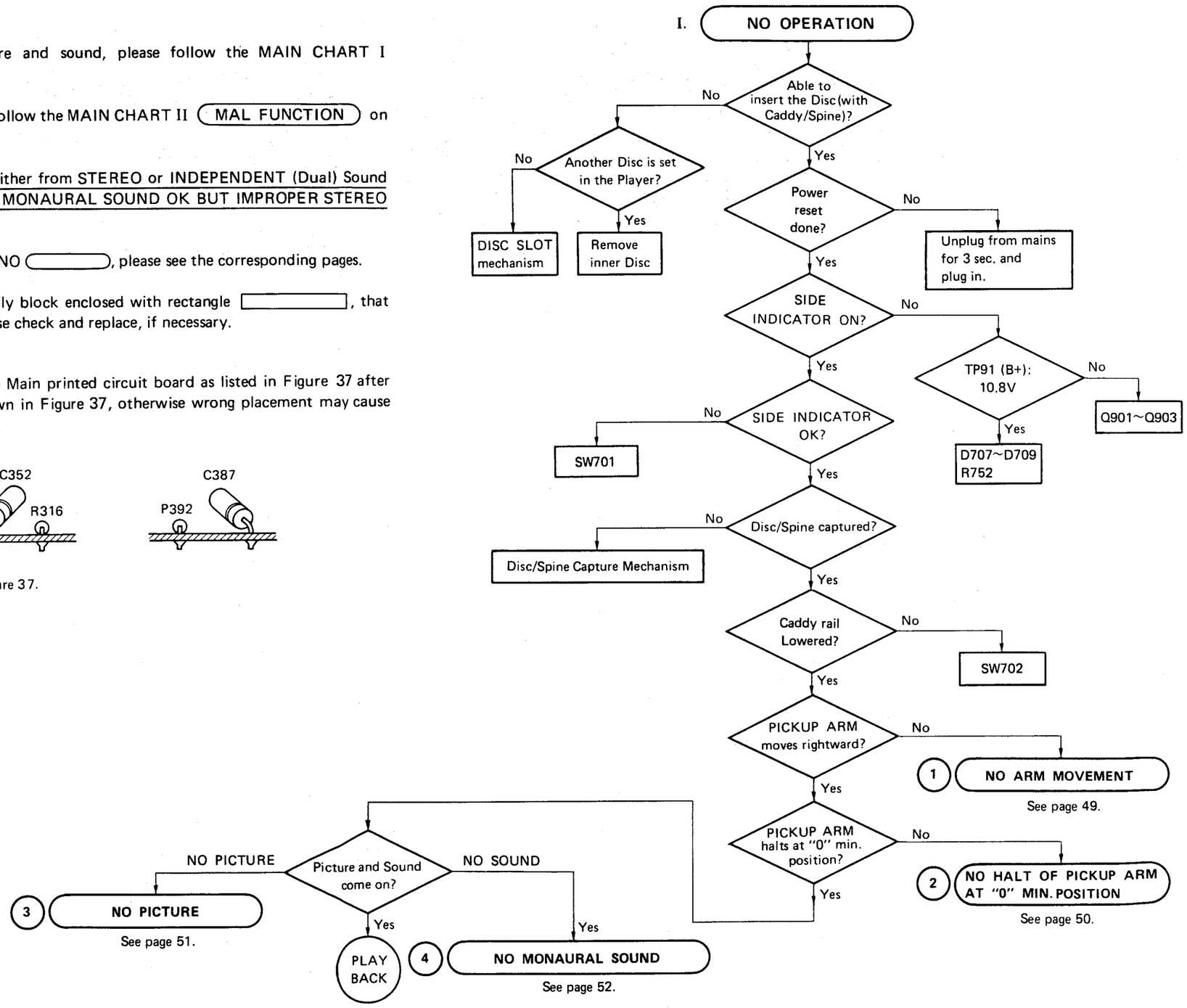
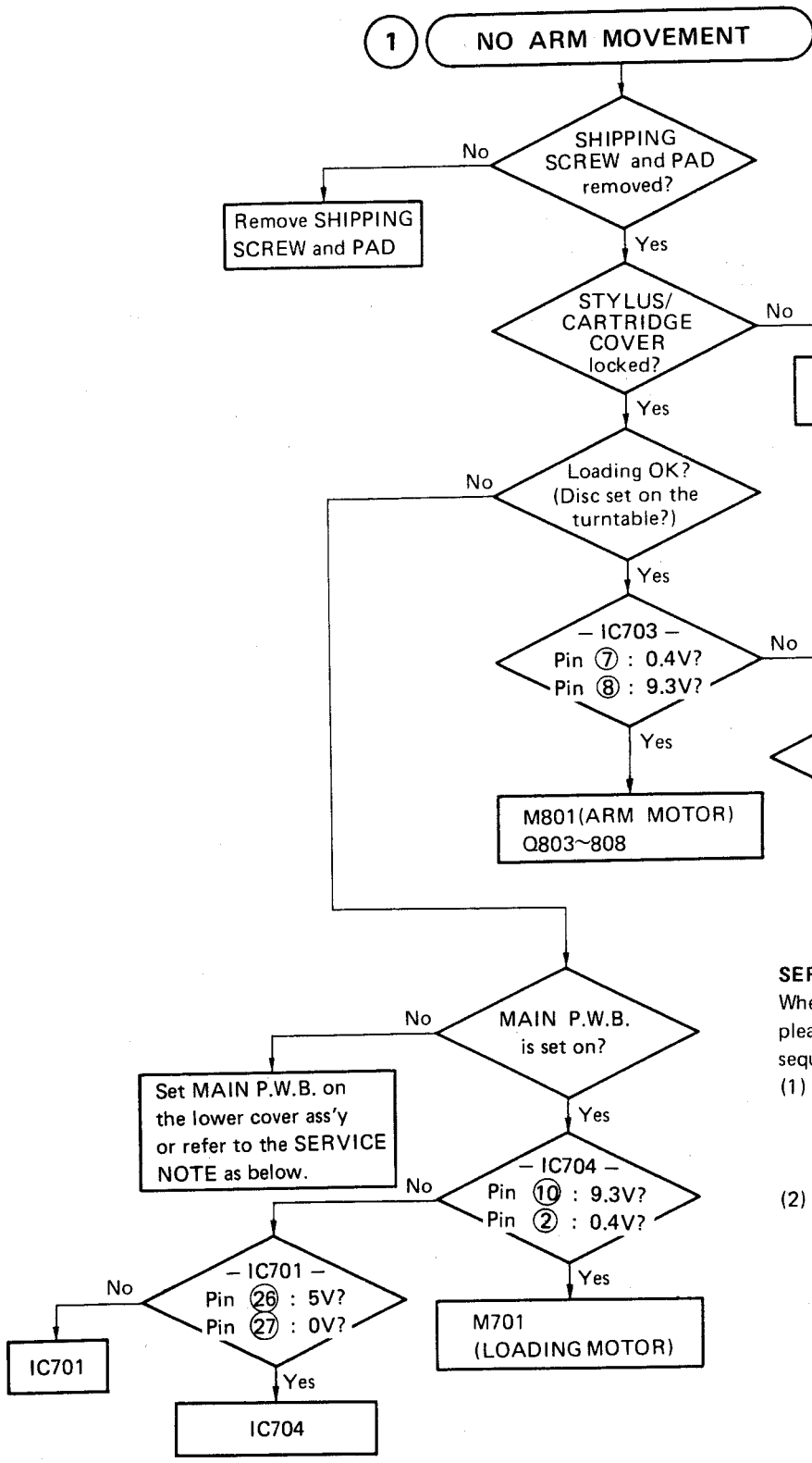


Figure 37.





SERVICING NOTE:

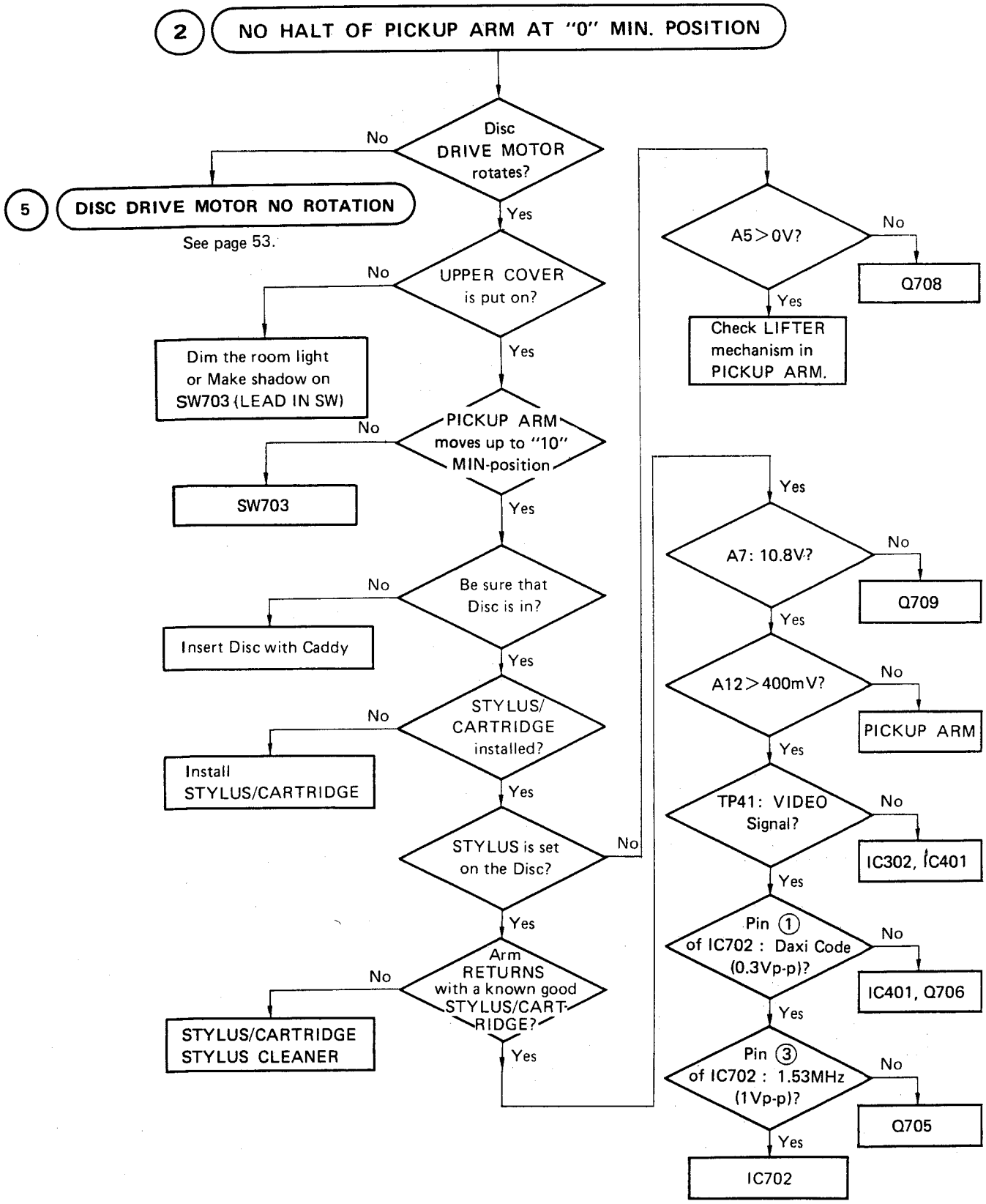
When servicing with MAIN PWB lifted, please observe either of the following sequences.

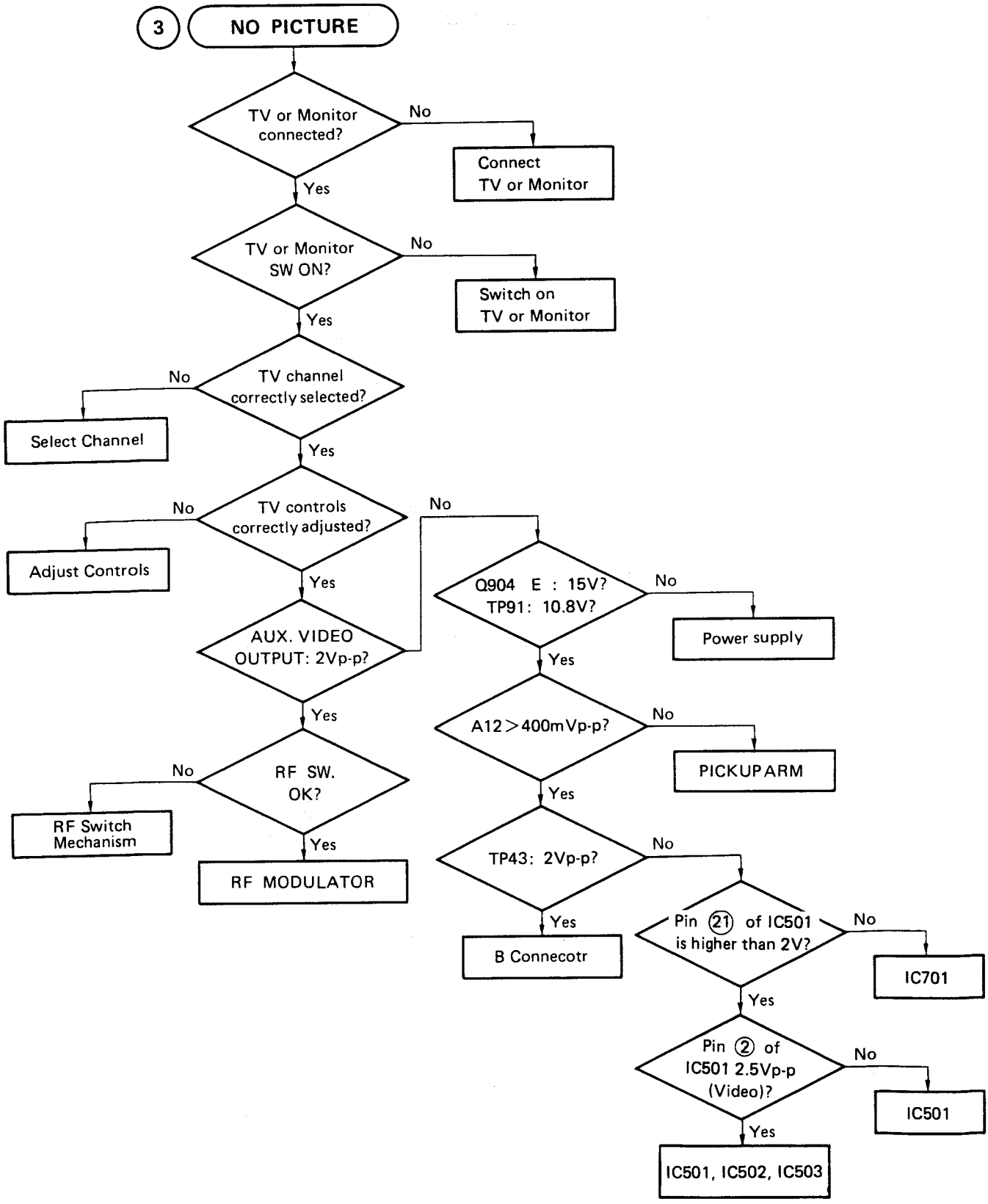
(1) Set MAIN PWB on the Lower Cover Ass'y in place and after the Lead-in and Play-back starts, lift and set it at servicing position.

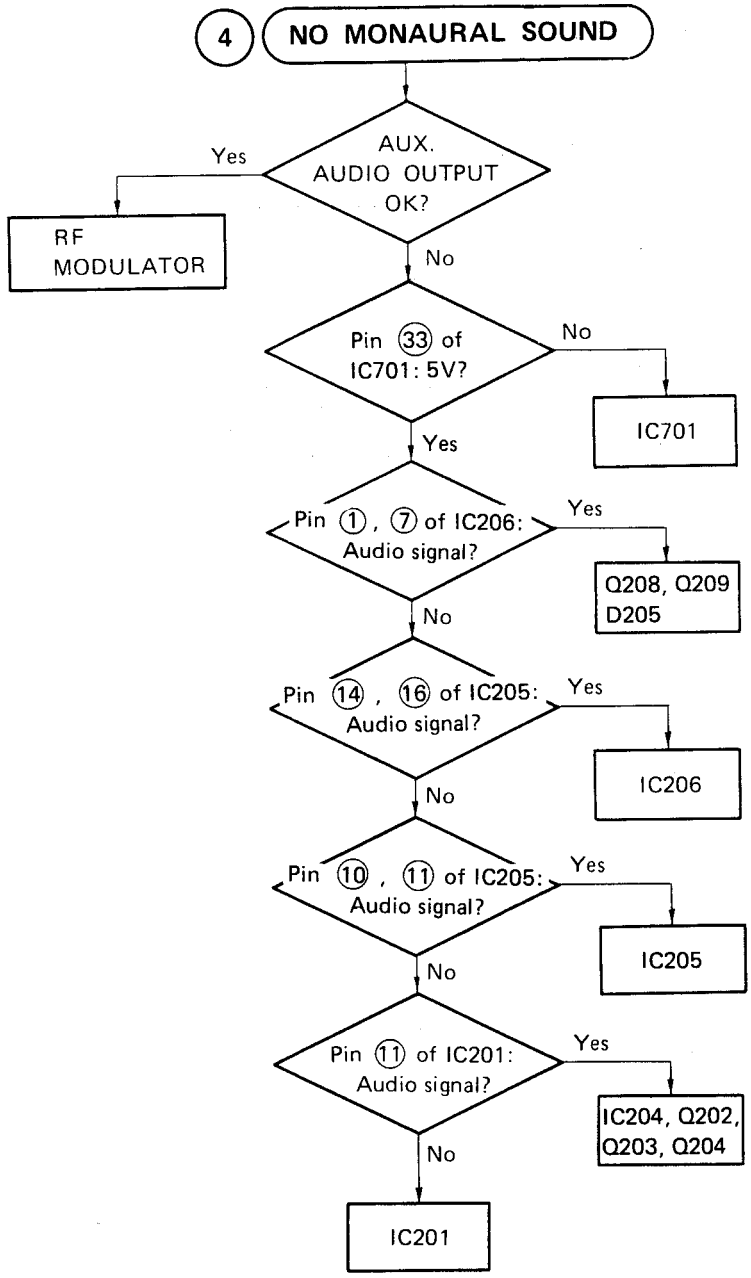
(2) Another way to start playing for servicing purpose with MAIN PWB lifted.

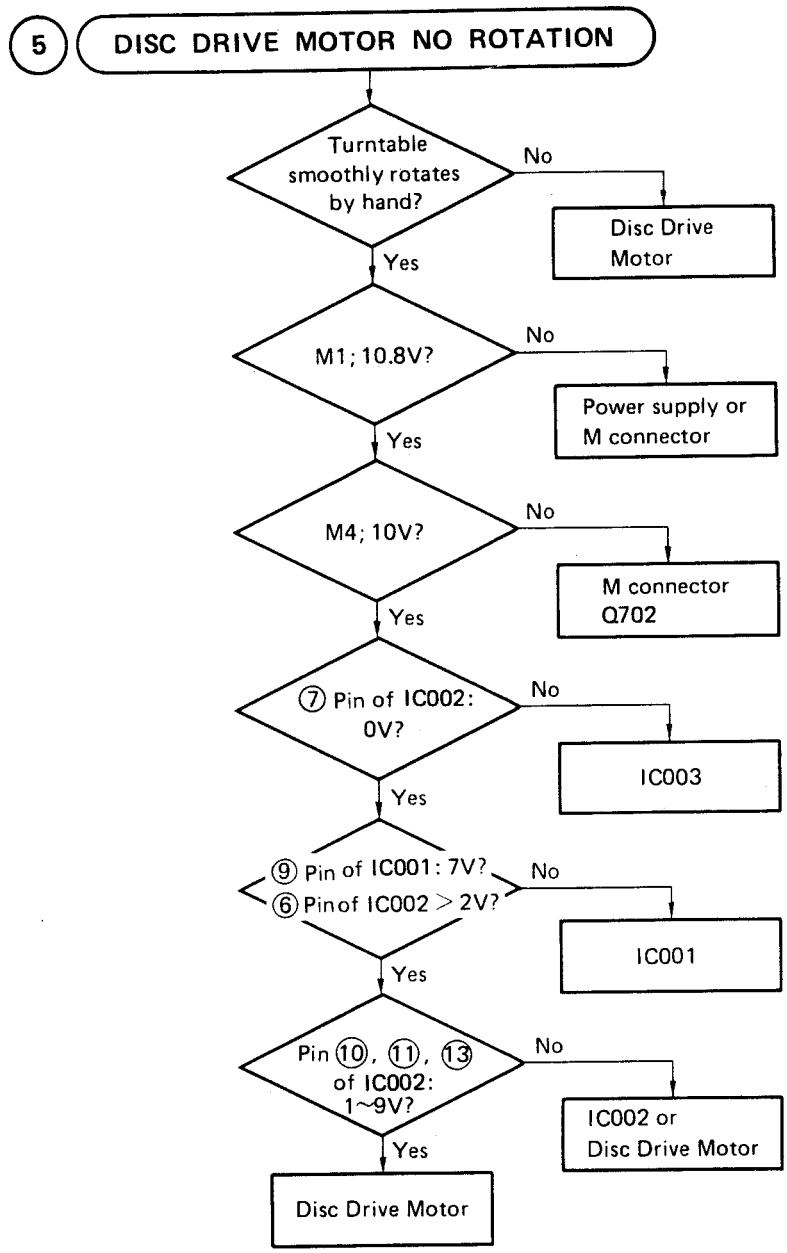
(a) Insert and keep a coin or any interceptive object between LEAD-IN SW (SW 703) and press PLAY button ... Loading and ARM moves.

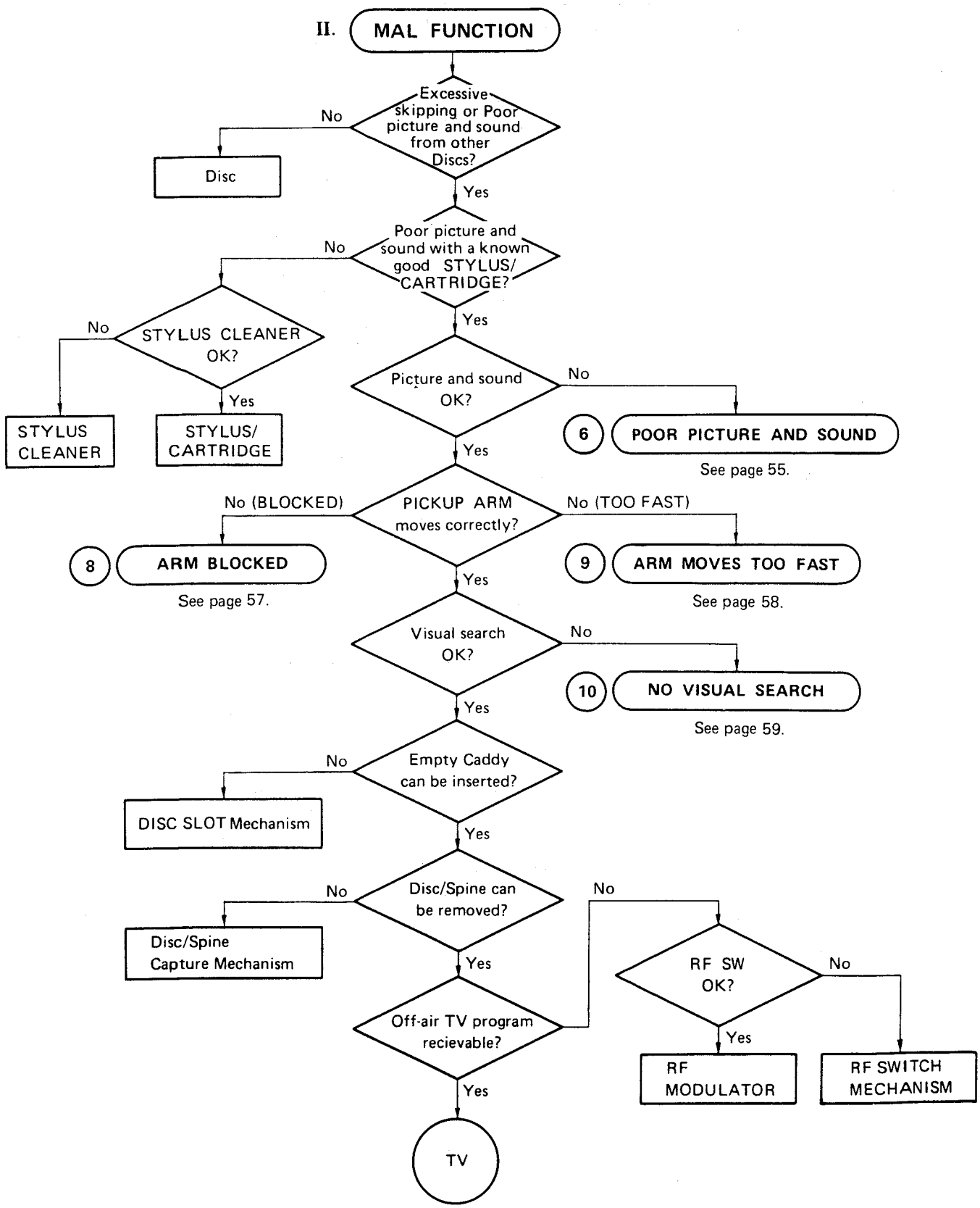
(b) After ARM reaches well inside this Disc, pull out – reinsert – pull out again above interceptive object through LEAD-IN SW, then ARM stops and Lead-in/Play operation start.

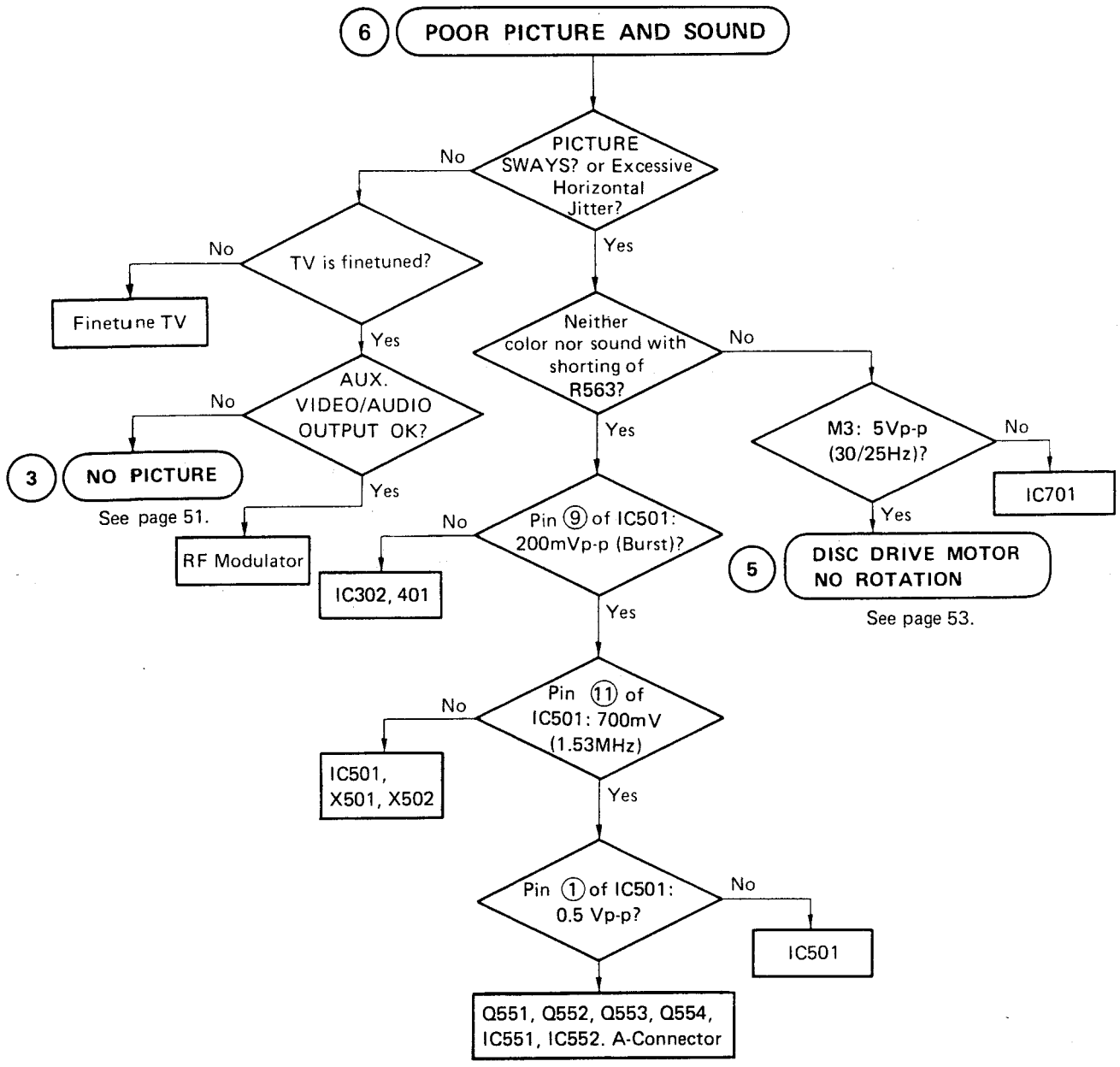

2
NO HALT OF PICKUP ARM AT "0" MIN. POSITION
Disc DRIVE MOTOR rotates?
No
5
DISC DRIVE MOTOR NO ROTATION
See page 53.
Yes
UPPER COVER is put on?
No
Dim the room light or Make shadow on SW703 (LEAD IN SW)
Yes
PICKUP ARM moves up to "10" MIN-position
No
SW703
Yes
Be sure that Disc is in?
No
Insert Disc with Caddy
Yes
STYLUS/ CARTRIDGE installed?
No
Install STYLUS/CARTRIDGE
Yes
STYLUS is set on the Disc?
No
Yes
Arm RETURNS with a known good STYLUS/CART-RIDGE?
No
STYLUS/CARTRIDGE STYLUS CLEANER
Yes
A5>0V?
No
Q708
Yes
Check LIFTER mechanism in PICKUP ARM.
Yes
A7: 10.8V?
No
Q709
Yes
A12>400mV?
No
PICKUP ARM
Yes
TP41: VIDEO Signal?
No
IC302, IC401
Yes
Pin ① of IC702 : Daxi Code (0.3Vp-p)?
No
IC401, Q706
Yes
Pin ③ of IC702 : 1.53MHz (1Vp-p)?
No
Q705
Yes
IC702

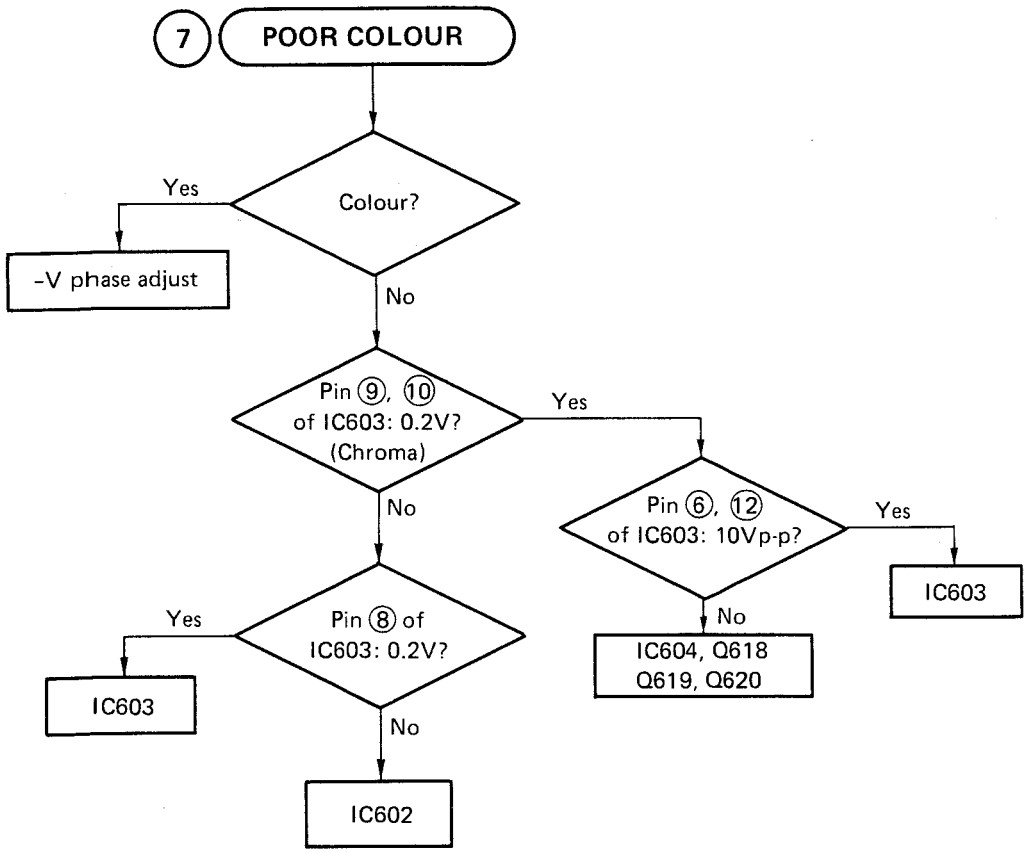

3
NO PICTURE
TV or Monitor connected?
No
Connect TV or Monitor
Yes
TV or Monitor SW ON?
No
Switch on TV or Monitor
Yes
TV channel correctly selected?
No
Select Channel
Yes
TV controls correctly adjusted?
No
Adjust Controls
Yes
AUX. VIDEO OUTPUT: 2Vp-p?
No
Yes
RF SW. OK?
No
RF Switch Mechanism
Yes
RF MODULATOR
Q904 E : 15V? TP91: 10.8V?
No
Power supply
Yes
A12>400mVp-p?
No
PICKUP ARM
Yes
TP43: 2Vp-p?
No
Yes
B Connecotr
Pin (21) of IC501 is higher than 2V?
No
IC701
Yes
Pin (2) of IC501 2.5Vp-p (Video)?
No
IC501
Yes
IC501, IC502, IC503

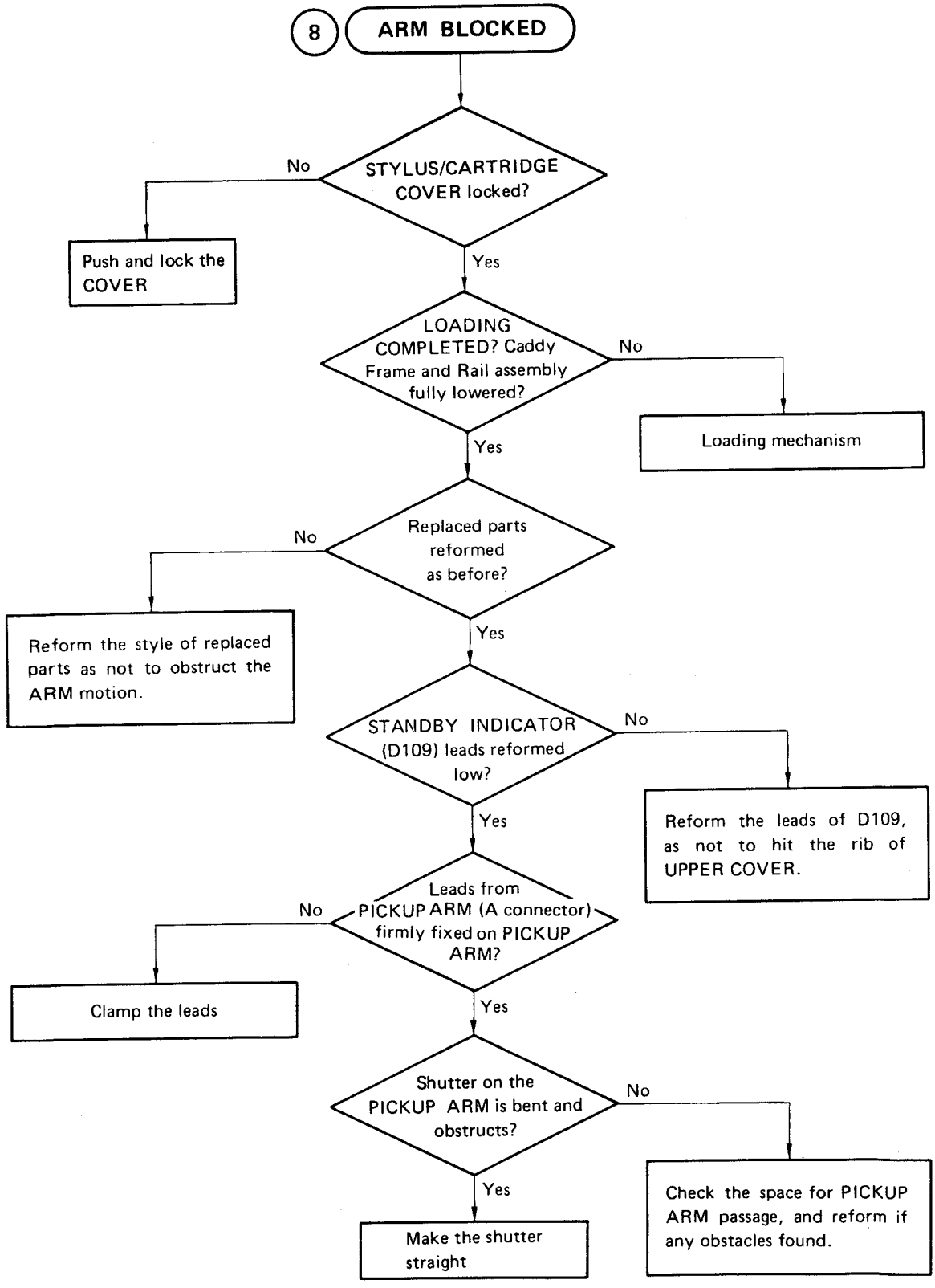

4
NO MONAURAL SOUND
AUX. AUDIO OUTPUT OK?
Yes
RF MODULATOR
No
Pin (33) of IC701: 5V?
No
IC701
Yes
Pin (1), (7) of IC206: Audio signal?
Yes
Q208, Q209 D205
No
Pin (14), (16) of IC205: Audio signal?
Yes
IC206
No
Pin (10), (11) of IC205: Audio signal?
Yes
IC205
No
Pin (11) of IC201: Audio signal?
Yes
IC204, Q202, Q203, Q204
No
IC201

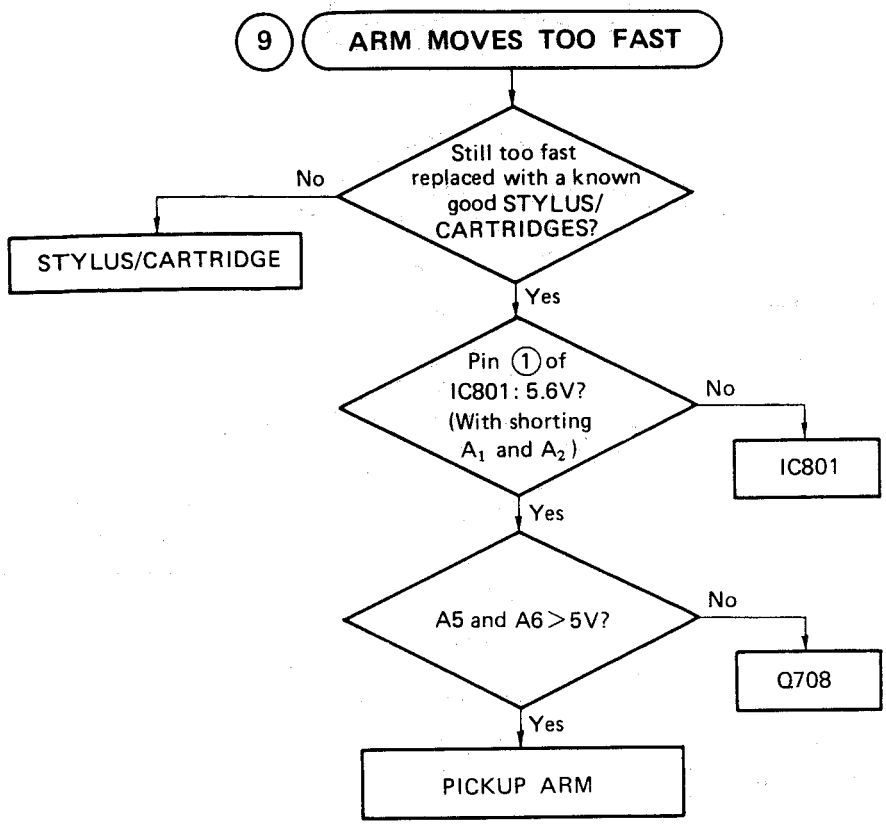

5
DISC DRIVE MOTOR NO ROTATION
Turntable smoothly rotates by hand?
No
Disc Drive Motor
Yes
M1; 10.8V?
No
Power supply or M connector
Yes
M4; 10V?
No
M connector Q702
Yes
⑦ Pin of IC002: 0V?
No
IC003
Yes
⑨ Pin of IC001: 7V?
⑥ Pinof IC002 > 2V?
No
IC001
Yes
Pin ⑩, ⑪, ⑬ of IC002: 1~9V?
No
IC002 or Disc Drive Motor
Yes
Disc Drive Motor

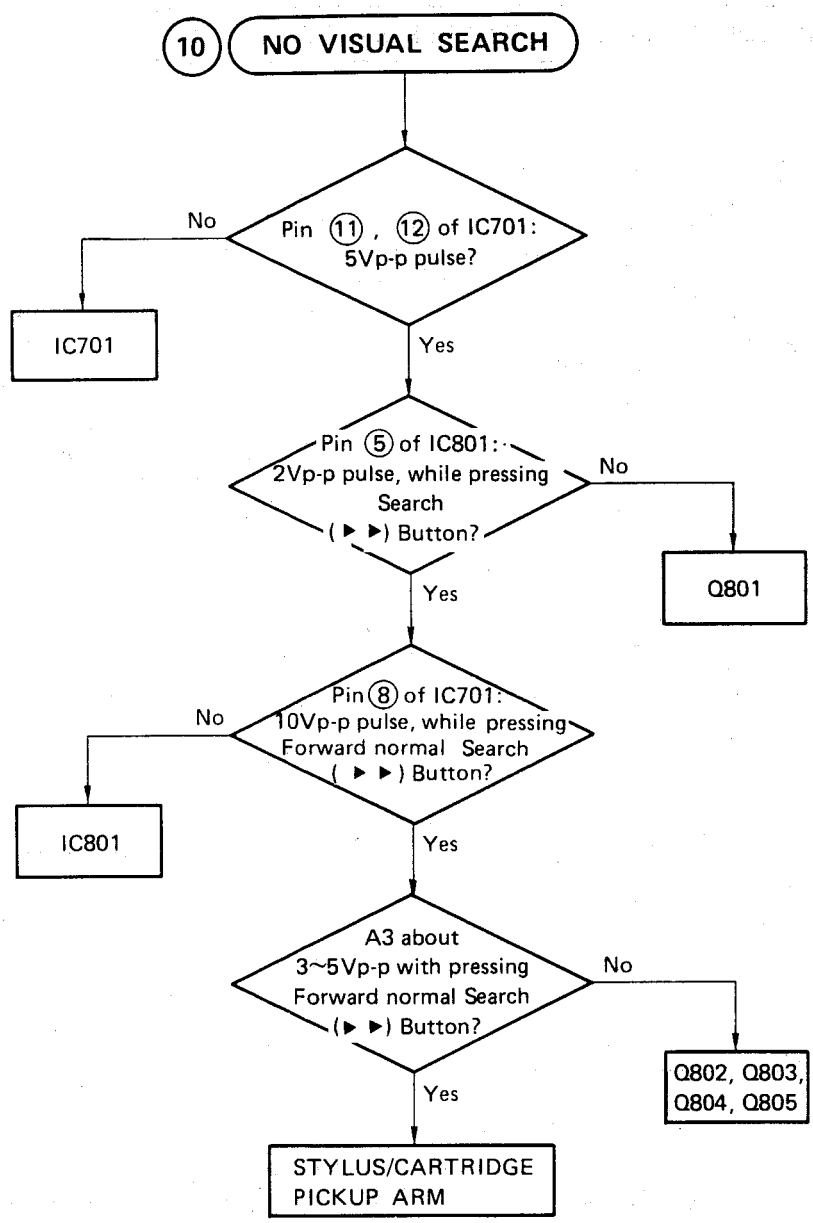

II. MAL FUNCTION
Excessive skipping or Poor picture and sound from other Discs?
No
Disc
Yes
Poor picture and sound with a known good STYLUS/ CARTRIDGE?
No
Yes
STYLUS CLEANER OK?
No
Yes
STYLUS CLEANER
STYLUS/ CARTRIDGE
Picture and sound OK?
No
6 POOR PICTURE AND SOUND
See page 55.
Yes
PICKUP ARM moves correctly?
No (BLOCKED)
No (TOO FAST)
8 ARM BLOCKED
See page 57.
9 ARM MOVES TOO FAST
See page 58.
Yes
Visual search OK?
No
10 NO VISUAL SEARCH
See page 59.
Yes
Empty Caddy can be inserted?
No
DISC SLOT Mechanism
Yes
Disc/Spine can be removed?
No
Disc/Spine Capture Mechanism
Yes
Off-air TV program recievable?
No
RF SW OK?
No
Yes
RF MODULATOR
RF SWITCH MECHANISM
Yes
TV


6
POOR PICTURE AND SOUND
PICTURE SWAYS? or Excessive Horizontal Jitter?
No
Yes
TV is finetuned?
No
Finetune TV
Yes
AUX. VIDEO/AUDIO OUTPUT OK?
No
3
NO PICTURE
See page 51.
Yes
RF Modulator
Neither color nor sound with shorting of R563?
No
Yes
Pin ⑨ of IC501: 200mVp-p (Burst)?
No
IC302, 401
Yes
M3: 5Vp-p (30/25Hz)?
No
IC701
Yes
5
DISC DRIVE MOTOR NO ROTATION
See page 53.
Pin ⑪ of IC501: 700mV (1.53MHz)
No
IC501, X501, X502
Yes
Pin ① of IC501: 0.5 Vp-p?
No
IC501
Q551, Q552, Q553, Q554, IC551, IC552. A-Connector

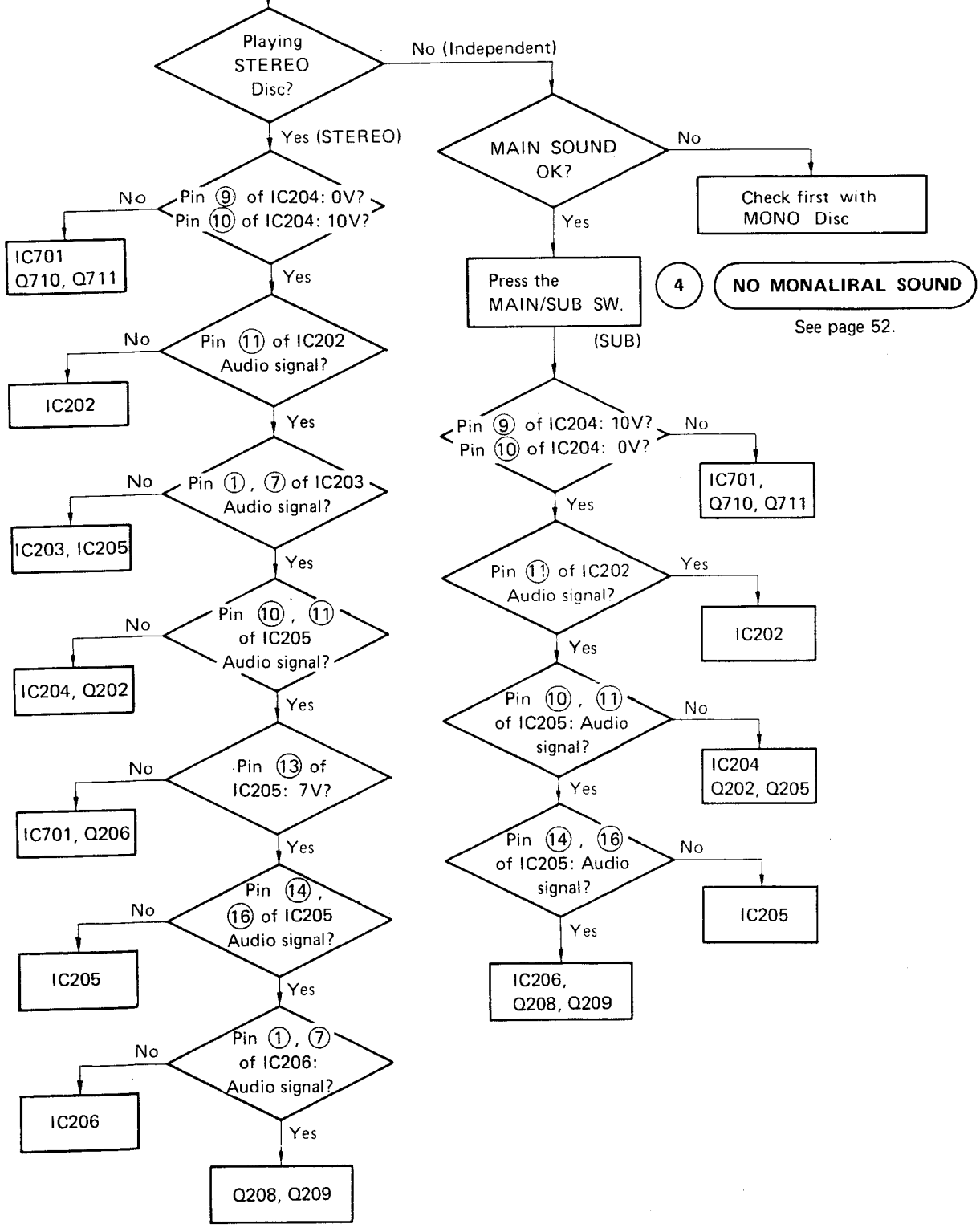

7
POOR COLOUR
Colour?
Yes
-V phase adjust
No
Pin ⑨, ⑩
of IC603: 0.2V?
(Chroma)
Yes
No
Pin ⑥, ⑫
of IC603: 10Vp-p?
Yes
IC603
No
IC604, Q618
Q619, Q620
Pin ⑧ of
IC603: 0.2V?
Yes
IC603
No
IC602


8
ARM BLOCKED
STYLUS/CARTRIDGE COVER locked?
No
Push and lock the COVER
Yes
LOADING COMPLETED? Caddy Frame and Rail assembly fully lowered?
No
Loading mechanism
Yes
Replaced parts reformed as before?
No
Reform the style of replaced parts as not to obstruct the ARM motion.
Yes
STANDBY INDICATOR (D109) leads reformed low?
No
Reform the leads of D109, as not to hit the rib of UPPER COVER.
Yes
Leads from PICKUP ARM (A connector) firmly fixed on PICKUP ARM?
No
Clamp the leads
Yes
Shutter on the PICKUP ARM is bent and obstructs?
No
Check the space for PICKUP ARM passage, and reform if any obstacles found.
Yes
Make the shutter straight


9
ARM MOVES TOO FAST
Still too fast replaced with a known good STYLUS/ CARTRIDGES?
No
STYLUS/CARTRIDGE
Yes
Pin ① of IC801: 5.6V? (With shorting A_1 and A_2)
No
IC801
Yes
A5 and A6 > 5V?
No
Q708
Yes
PICKUP ARM


10
NO VISUAL SEARCH
Pin (11), (12) of IC701: 5Vp-p pulse?
No
IC701
Yes
Pin (5) of IC801: 2Vp-p pulse, while pressing Search (▶▶) Button?
No
Q801
Yes
Pin (8) of IC701: 10Vp-p pulse, while pressing Forward normal Search (▶▶) Button?
No
IC801
Yes
A3 about 3~5Vp-p with pressing Forward normal Search (▶▶) Button?
No
Q802, Q803, Q804, Q805
Yes
STYLUS/CARTRIDGE PICKUP ARM

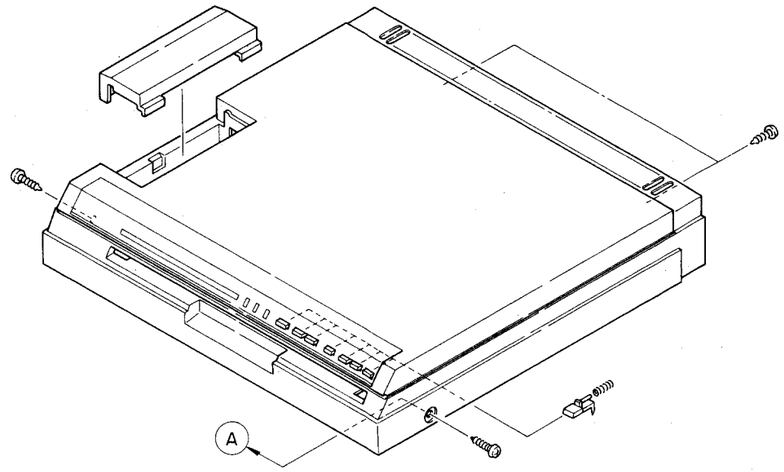
III MONAURAL SOUND OK BUT IMPROPER STEREO SOUND

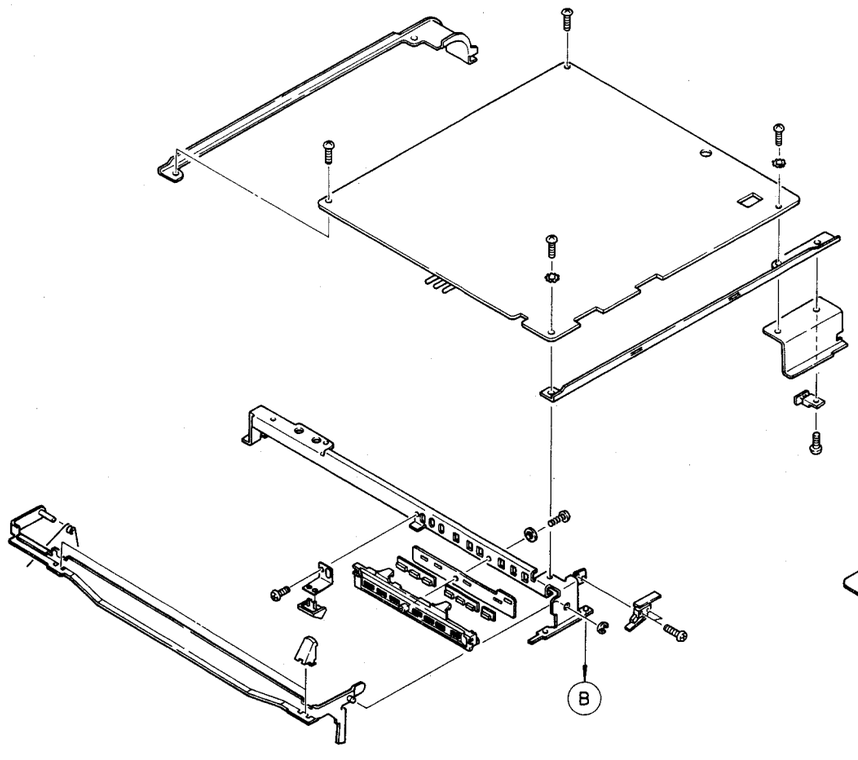


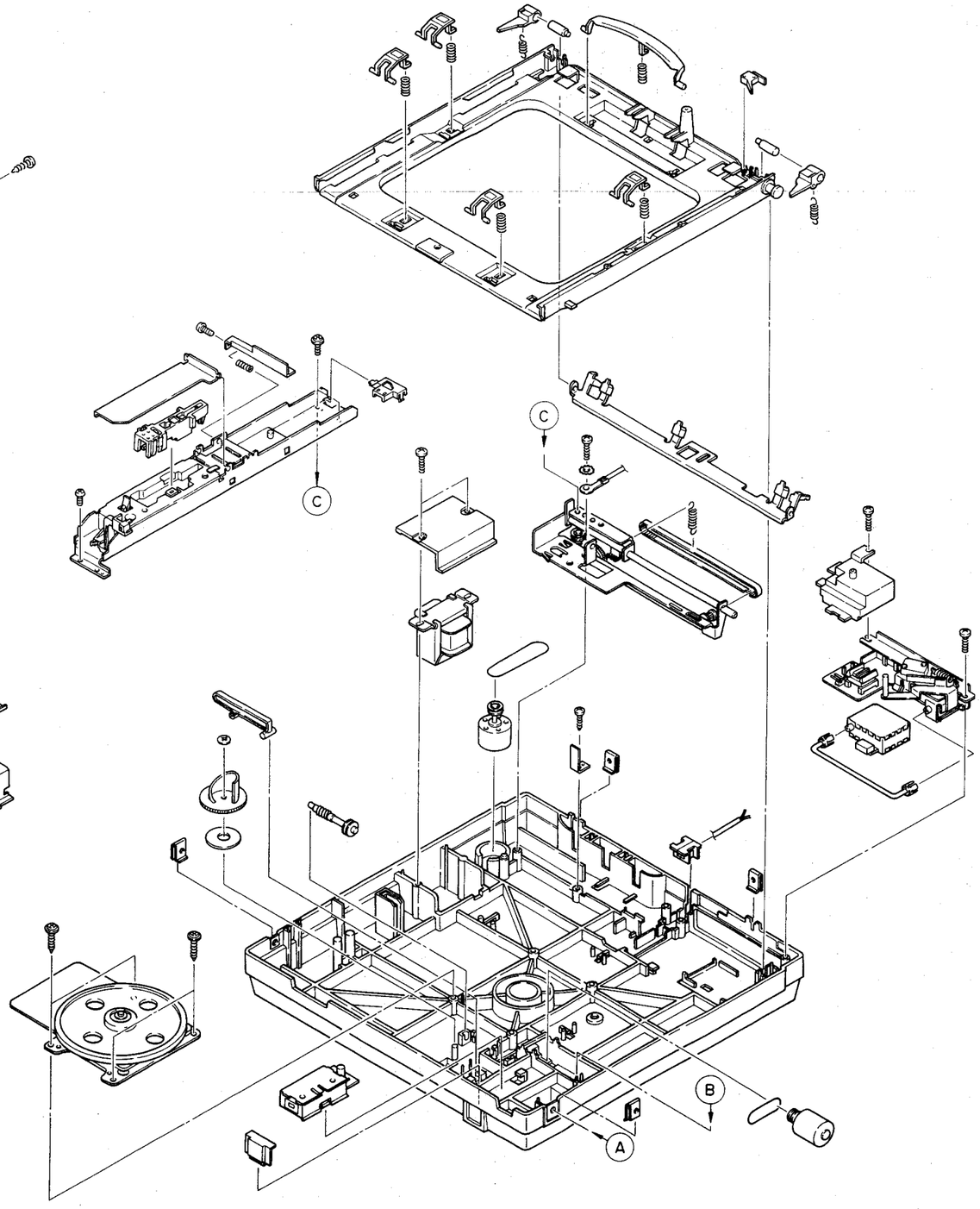
4 NO MONALIRAL SOUND

See page 52.

EXPLODED VIEWS







REPLACEMENT PARTS LIST

PRODUCT SAFETY NOTE : Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully , the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

ABBREVIATIONS: Capacitors . . . . . CD: Ceramic disk, PF: Polyester film, EL: Electrolytic, PP: Polypropylene, PR: Paper, TA: Tantalum, TM: Trimmer.
Resistors . . . . . CF: Carbon film, CC: Carbon composition, MF: Metal oxide film, VR: Variable resistor, WW: Wire would, FR: Fuse resistor, MG: Metal glazed.

SYMBOL NO.	PART NO.	DESCRIPTION
		CAPACITORS
C001	0253047	EL 22MF 16V
C002	0277013	PF 0.01MF +-10% 50V
C003	0274759	PF 4700PF +-10% 50V
C004	0299922	PP 0.047MF +-10% 200V
C005	0274771	PF 0.047MF +-10% 50V
C006	0276835	PF 0.1MF +-5% 50V
C007	0252862	CE 0.1MF 50V
C008	0253082	EL 1MF 50V
C010	0277025	PF 0.1MF +-10% 200V
C011	0274771	PF 0.047MF +-10% 50V
C012	0274771	PF 0.047MF +-10% 50V
C013	0274771	PF 0.047MF +-10% 50V
C014	0253082	EL 1MF 50V
C015	0277013	PF 0.01MF +-10% 50V
C016	0253082	EL 1MF 50V
C017	0244171	CD 0.01MF +80-20% 50V
C018	0253050	EL 100MF 16V
C020	0244171	CD 0.01MF +80-20% 50V
C021	0244171	CD 0.01MF +80-20% 50V
● C1001	0252532	EL 220MF 16V
● C1002	0252615	EL 4.7MF 25V
● C1003	0244171	CD 0.01MF +80-20% 50V
● C1004	0248684	CD 100PF +-5% 50V
● C1005	0248684	CD 100PF +-5% 50V
● C1006	0252615	EL 4.7MF 25V
C1051	0253066	EL 10MF 25V
C201	0244171	CD 0.01MF +80-20% 50V
C202	0244171	CD 0.01MF +80-20% 50V
C203	0274765	PF 0.015MF +-10% 50V
C204	0274765	PF 0.015MF +-10% 50V
C205	0277013	PF 0.01MF +-10% 50V
C206	0244171	CD 0.01MF +80-20% 50V
C207	0244115	CD 560PF +-10% 50V
C208	0274759	PF 4700PF +-10% 50V
C212	0244139	CD 1000PF +-10% 50V
C213	0253083	EL 2.2MF 50V
C221	0244171	CD 0.01MF +80-20% 50V
C222	0244171	CD 0.01MF +80-20% 50V
C223	0274767	PF 0.022MF +-10% 50V
C224	0274767	PF 0.022MF +-10% 50V
C225	0277013	PF 0.01MF +-10% 50V
C226	0244171	CD 0.01MF +80-20% 50V
C227	0244119	CD 390PF +-10% 50V
C228	0274759	PF 4700PF +-10% 50V
C229	0248684	CD 100PF +-5% 50V
C233	0253083	EL 2.2MF 50V
C241	0253082	EL 1MF 50V
C242	0253050	EL 100MF 16V
C243	0253050	EL 100MF 16V
C244	0277013	PF 0.01MF +-10% 50V
C245	0277013	PF 0.01MF +-10% 50V
C251	0253082	EL 1MF 50V
C252	0253066	EL 10MF 25V
C253	0253066	EL 10MF 25V
C254	0253083	EL 2.2MF 50V
C255	0253083	EL 2.2MF 50V
C256	0276833	PF 0.068MF +-5% 50V
C257	0276833	PF 0.068MF +-5% 50V
C258	0276835	PF 0.1MF +-5% 50V
C259	0251079	EL 22MF 16V
C260	0253081	EL 0.47MF DC50V
C261	0253070	EL 100MF DC25V
C262	0253051	EL 220MF 16V
C271	0274759	PF 4700PF +-10% 50V
C272	0274759	PF 4700PF +-10% 50V
C273	0274759	PF 4700PF +-10% 50V
C274	0274759	PF 4700PF +-10% 50V
C275	0253066	EL 10MF 25V
C276	0253066	EL 10MF 25V
C301	0244115	CD 560PF +-10% 50V
C302	0248692	CD 220PF +-5% 50V
C303	0244171	CD 0.01MF +80-20% 50V
C304	0246417	CD 7PF +-0.25PF 50V
C305	0244171	CD 0.01MF +80-20% 50V
C306	0244171	CD 0.01MF +80-20% 50V
C307	0244171	CD 0.01MF +80-20% 50V
C308	0244171	CD 0.01MF +80-20% 50V
C309	0253050	EL 100MF 16V
C310	0244171	CD 0.01MF +80-20% 50V
C312	0249093	CD 470PF +-5% 50V
C313	0249093	CD 470PF +-5% 50V
C314	0246416	CD 6PF +-0.25PF 50V
C315	0248668	CD 22PF +-5% 50V
C316	0248676	CD 47PF +-5% 50V
C317	0248668	CD 22PF +-5% 50V

● . . . . . For VIP201P Only

PRODUCT SAFETY NOTE: Components marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully, the PRODUCT SAFETY NOTICE of this Service Manual. Don't degrade the safety of the receiver through improper servicing.

SYMBOL NO.	PART NO.	DESCRIPTION
C318	0244171	CD 0.01MF +80-20% 50V
C319	0244171	CD 0.01MF +80-20% 50V
C320	0246454	CD 39PF +-5% 50V
C321	2784693	TRIMMER CAPACITOR 30PF
C322	0244171	CD 0.01MF +80-20% 50V
C323	0253050	EL 100MF 16V
C324	0248676	CD 47PF +-5% 50V
C325	0244171	CD 0.01MF +80-20% 50V
C326	0253082	EL 1MF 50V
C327	0246418	CD 8PF +-0.25PF 50V
C328	0246418	CD 8PF +-0.25PF 50V
C329	0248682	CD 82PF +-5% 50V
C330	0248682	CD 82PF +-5% 50V
C331	0246416	CD 6PF +-0.25PF 50V
C332	0248688	CD 150PF +-5% 50V
C333	0253050	EL 100MF 16V
C334	0253048	EL 33MF 16V
C335	0248690	CD 180PF +-5% 50V
C336	0244171	CD 0.01MF +80-20% 50V
C337	0244111	CD 6800PF +-10% 50V
C338	0244171	CD 0.01MF +80-20% 50V
C339	0244171	CD 0.01MF +80-20% 50V
C340	0253048	EL 33MF 16V
C341	0253065	EL 4.7MF 25V
C342	0244171	CD 0.01MF +80-20% 50V
C343	0244171	CD 0.01MF +80-20% 50V
C345	0248680	CD 68PF +-5% 50V
C346	0246415	CD 5PF +-0.25PF 50V
C347	0248684	CD 100PF +-5% 50V
C348	0248662	CD 12PF +-5% 50V
C349	0253081	EL 0.47MF DC50V
C350	0248682	CD 82PF +-5% 50V
C351	0244171	CD 0.01MF +80-20% 50V
C401	0253049	EL 47MF 16V
C402	0244171	CD 0.01MF +80-20% 50V
C403	0244171	CD 0.01MF +80-20% 50V
C404	0253067	EL 22MF 25V
C405	0244171	CD 0.01MF +80-20% 50V
C406	0253082	EL 1MF 50V
C407	0244171	CD 0.01MF +80-20% 50V
C408	0244171	CD 0.01MF +80-20% 50V
C409	0253085	EL 4.7MF 50V
C410	0253085	EL 4.7MF 50V
C411	0253086	EL 10MF 50V
C412	0274759	PF 4700PF +-10% 50V
C413	0244171	CD 0.01MF +80-20% 50V
C414	0244171	CD 0.01MF +80-20% 50V
C415	0248515	CD 110 PF+-5% DC50WV
C416	0248515	CD 110 PF+-5% DC50WV
C417	0244171	CD 0.01MF +80-20% 50V
C418	0248670	CD 27PF +-5% 50V
C419	0248678	CD 56PF +-5% 50V
C420	0253048	EL 33MF 16V
C421	0248678	CD 56PF +-5% 50V
C422	0244115	CD 560PF +-10% 50V
C423	0248694	CD 270PF +-5% 50V
C424	0253050	EL 100MF 16V
C427	0248699	CD 390PF +-5% 50V
C428	0248686	CD 120PF +-5% 50V
C429	0253048	EL 33MF 16V
C430	0248676	CD 47PF +-5% 50V
C431	0248684	CD 100PF +-5% 50V
C432	0248676	CD 47PF +-5% 50V
C433	0244171	CD 0.01MF +80-20% 50V
C501	0253049	EL 47MF 16V
C502	0244171	CD 0.01MF +80-20% 50V
C503	0248696	CD 0.01MF +-5% 50V
C504	0244173	CD 0.022MF +80-10% 50V
C505	0248694	CD 270PF +-5% 50V
C506	0244139	CD 1000PF +-10% 50V
C507	0244173	CD 0.022MF +80-10% 50V
C508	0248686	CD 120PF +-5% 50V
C509	0246418	CD 8PF +-0.25PF 50V
C510	0246449	CD 24PF +-5% 50V
C511	0246463	CD 91PF +-5% 50V
C512	0244171	CD 0.01MF +80-20% 50V
C513	0246449	CD 24PF +-5% 50V
C514	0248694	CD 270PF +-5% 50V
C515	0244171	CD 0.01MF +80-20% 50V
C516	0248678	CD 56PF +-5% 50V
C517	0248686	CD 120PF +-5% 50V
C518	0246446	CD 18PF +-5% 50V
C519	0246418	CD 8PF +-0.25PF 50V
C520	2784691	TRIMMER CAPACITOR 10PF
C521	0244171	CD 0.01MF +80-20% 50V
C522	0277001	PF 1000PF +-10% 50V
C523	0253049	EL 47MF 16V
C524	0244173	CD 0.022MF +80-10% 50V
C525	0253049	EL 47MF 16V
C526	0248668	CD 22PF +-5% 50V
C527	0248674	CD 39PF +-5% 50V
C528	0248676	CD 47PF +-5% 50V
C530	0253054	EL 1000MF 16V
C532	0244171	CD 0.01MF +80-20% 50V
C533	0244171	CD 0.01MF +80-20% 50V
C534	0248678	CD 56PF +-5% 50V
C535	0248688	CD 150PF +-5% 50V
C551	0277025	PF 0.1MF +-10% 200V
C552	0277005	PF 2200PF +-10% 50V
C553	0253050	EL 100MF 16V

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SYMBOL NO.	PART NO.	DESCRIPTION
C554	0277013	PF 0.01MF +-10% 50V
C555	0274771	PF 0.047MF +-10% 50V
C556	0259937	EL 2.2MF 50V
C557	0259937	EL 2.2MF 50V
C558	0244171	CD 0.01MF +80-20% 50V
C601	0244171	CD 0.01MF +80-20% 50V
C603	0244171	CD 0.01MF +80-20% 50V
C604	0244171	CD 0.01MF +80-20% 50V
C605	0244171	CD 0.01MF +80-20% 50V
C606	0253048	EL 33MF 16V
C607	0244171	CD 0.01MF +80-20% 50V
C608	0244171	CD 0.01MF +80-20% 50V
C609	0248036	CD 18PF +-5% 50V
C610	0244171	CD 0.01MF +80-20% 50V
C611	0244171	CD 0.01MF +80-20% 50V
C612	0244171	CD 0.01MF +80-20% 50V
C613	0253048	EL 33MF 16V
C614	0248686	CD 120PF +-5% 50V
C615	0244171	CD 0.01MF +80-20% 50V
C616	0244171	CD 0.01MF +80-20% 50V
C617	0248682	CD 82PF +-5% 50V
C618	0244171	CD 0.01MF +80-20% 50V
C619	0244171	CD 0.01MF +80-20% 50V
C620	0244171	CD 0.01MF +80-20% 50V
C623	0253085	EL 4.7MF 50V
C624	0248686	CD 120PF +-5% 50V
C625	0244171	CD 0.01MF +80-20% 50V
C626	0244171	CD 0.01MF +80-20% 50V
C627	0248682	CD 82PF +-5% 50V
C628	0244171	CD 0.01MF +80-20% 50V
C629	0277001	PF 1000PF +-10% 50V
C630	0253048	EL 33MF 16V
C631	0244115	CD 560PF +-10% 50V
C632	0253048	EL 33MF 16V
C633	0299001	PP 0.001MF +-2% 100V
C634	0277005	PF 2200PF +-10% 50V
C635	0253048	EL 33MF 16V
C636	0248688	CD 150PF +-5% 50V
C637	0248688	CD 150PF +-5% 50V
C638	0248692	CD 220PF +-5% 50V
C639	0244103	CD 1500PF +-10% 50V
C640	0253049	EL 47MF 16V
C641	0253050	EL 100MF 16V
C642	0244171	CD 0.01MF +80-20% 50V
C701	0244171	CD 0.01MF +80-20% 50V
C702	0246454	CD 39PF +-5% 50V
C703	0244171	CD 0.01MF +80-20% 50V
C705	0252866	EL 1MF 50V
C706	0277013	PF 0.01MF +-10% 50V
C707	0246420	CD 10PF +-0.5% 50V
C708	0253082	EL 1MF 50V
C709	0253066	EL 10MF 25V
C710	0247951	CD 22PF+-5% 50V
C711	0253066	EL 10MF 25V
C714	0244136	CD 270 PF+-10% 50V
C715	0253048	EL 33MF 16V
C716	0253048	EL 33MF 16V
C717	0253011	EL 220MF DC6.3WV
C718	0244171	CD 0.01MF +80-20% 50V
● C719	0244171	CD 0.01MF +80-20% 50V
● C720	0274761	PF 6800PF +-10% 50V
C721	0244171	CD 0.01MF +80-20% 50V
C722	0253066	EL 10MF 25V
C725	0244171	CD 0.01MF +80-20% 50V
C726	0244171	CD 0.01MF +80-20% 50V
C728	0244171	CD 0.01MF +80-20% 50V
C729	0244171	CD 0.01MF +80-20% 50V
C730	0244171	CD 0.01MF +80-20% 50V
C731	0244139	CD 1000PF +-10% 50V
C732	0253082	EL 1MF 50V
C801	0274665	PF 0.015MF 50V
C802	0248664	CD 15PF DC50V
C803	0253071	EL 220MF 25V
C804	0253050	EL 100MF 16V
C805	0253048	EL 33MF 16V
C806	0244171	CD 0.01MF +80-20% 50V
C901	0244105	CD 2200PF +-10% 50V
C902	0244105	CD 2200PF +-10% 50V
C903	0244105	CD 2200PF +-10% 50V
C904	0244105	CD 2200PF +-10% 50V
⚠ C905	0252670	EL 3900MF DC25WV
⚠ C906	0253072	EL 330MF 25V
⚠ C907	0253072	EL 330MF 25V
C908	0253070	EL 100MF DC25V
⚠ C909	0253070	EL 100MF DC25V
C910	0253084	EL 3.3MF 50V
C911	0253050	EL 100MF 16V
C913	0253050	EL 100MF 16V

RESISTORS

R001	0100108	CF 62K OHM +-5% 1/8W
R002	0150039	VR RS-8 20 KOHM-B
R003	0100065	CF 1K OHM +-5% 1/8W
R004	0100121	CF 220K OHM +-5% 1/8W
R005	0100059	CF 560 OHM +-5% 1/8W
R007	0100095	CF 18K OHM +-5% 1/8W
R008	0100083	CF 5.6K OHM +-5% 1/8W
R009	0100087	CF 8.2K OHM +-5% 1/8W
R010	0100119	CF 180K OHM +-5% 1/8W

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SYMBOL NO.	PART NO.	DESCRIPTION
R011	0100065	CF 1K OHM +-5% 1/8W
R012	0100121	CF 220K OHM +-5% 1/8W
R013	0100065	CF 1K OHM +-5% 1/8W
R014	0100121	CF 220K OHM +-5% 1/8W
R015	0100065	CF 1K OHM +-5% 1/8W
R016	0100121	CF 220K OHM +-5% 1/8W
R017	0100041	CF 100 OHM +-5% 1/8W
R018	0119514	FR 10 OHM +-5% 1/4W
R019	0119514	FR 10 OHM +-5% 1/4W
R020	0119514	FR 10 OHM +-5% 1/4W
R021	0100059	CF 560 OHM +-5% 1/8W
R022	0100089	CF 10K OHM +-5% 1/8W
R023	0100059	CF 560 OHM +-5% 1/8W
R024	0100113	CF 100K OHM +-5% 1/8W
R026	0114137	CF 180 OHM +-5% 1/4W
R030	0179538	MG 4.7M OHM +-5% 1/8W
● R1001	0100105	CF 47K OHM +-5% 1/8W
● R1002	0100105	CF 47K OHM +-5% 1/8W
● R1003	0150041	VR 100K OHM-B RS-8
● R1004	0100097	CF 22K OHM +-5% 1/8W
● R1005	0100065	CF 1K OHM +-5% 1/8W
● R1010	0100073	CF 2.2K OHM +-5% 1/8W
R1051	0187087	CF 8.2K OHM +-5% 1/16W
R1052	0187091	CF 12K OHM +-5% 1/16W
R1053	0187085	CF 6.8K OHM +-5% 1/16W
R1054	0187087	CF 8.2K OHM +-5% 1/16W
R1055	0187087	CF 8.2K OHM +-5% 1/16W
R1056	0187087	CF 8.2K OHM +-5% 1/16W
R1057	0100037	CF 68 OHM +-5% 1/8W
R1058	0187065	CF 1K OHM +-5% 1/16W
R1059	0187065	CF 1K OHM +-5% 1/16W
R1060	0187049	CF 220 OHM +-5% 1/16W
R201	0187081	CF 4.7K OHM +-5% 1/16W
R202	0187081	CF 4.7K OHM +-5% 1/16W
R203	0187093	CF 15K OHM +-5% 1/16W
R204	0187087	CF 8.2K OHM +-5% 1/16W
R205	0187093	CF 15K OHM +-5% 1/16W
R206	0187087	CF 8.2K OHM +-5% 1/16W
R207	0187051	CF 270 OHM +-5% 1/16W
R208	0187051	CF 270 OHM +-5% 1/16W
R209	0150039	VR RS-8 20 KOHM-B
R210	0187107	CF 56K OHM +-5% 1/16W
R211	0187069	CF 1.5K OHM +-5% 1/16W
R212	0187069	CF 1.5K OHM +-5% 1/16W
R213	0187085	CF 6.8K OHM +-5% 1/16W
R214	0187085	CF 6.8K OHM +-5% 1/16W
R215	0187069	CF 1.5K OHM +-5% 1/16W
R216	0187089	CF 10K OHM +-5% 1/16W
R221	0187081	CF 4.7K OHM +-5% 1/16W
R222	0187081	CF 4.7K OHM +-5% 1/16W
R223	0187093	CF 15K OHM +-5% 1/16W
R224	0187087	CF 8.2K OHM +-5% 1/16W
R225	0187093	CF 15K OHM +-5% 1/16W
R226	0187087	CF 8.2K OHM +-5% 1/16W
R227	0187047	CF 180 OHM +-5% 1/16W
R228	0187047	CF 180 OHM +-5% 1/16W
R229	0150039	VR RS-8 20 KOHM-B
R230	0150041	VR 100K OHM-B RS-8
R231	0187069	CF 1.5K OHM +-5% 1/16W
R232	0187069	CF 1.5K OHM +-5% 1/16W
R233	0187083	CF 5.6K OHM +-5% 1/16W
R234	0187083	CF 5.6K OHM +-5% 1/16W
R235	0187069	CF 1.5K OHM +-5% 1/16W
R236	0187089	CF 10K OHM +-5% 1/16W
R241	0187111	CF 82K OHM +-5% 1/16W
R242	0187099	CF 27K OHM +-5% 1/16W
R243	0187113	CF 100K OHM +-5% 1/16W
R244	0187099	CF 27K OHM +-5% 1/16W
R245	0187099	CF 27K OHM +-5% 1/16W
R246	0114137	CF 180 OHM +-5% 1/4W
R247	0187081	CF 4.7K OHM +-5% 1/16W
R248	0187083	CF 5.6K OHM +-5% 1/16W
R249	0100121	CF 220K OHM +-5% 1/8W
R251	0187097	CF 100 OHM +-5% 1/16W
R252	0187097	CF 100 OHM +-5% 1/16W
R253	0187093	CF 15K OHM +-5% 1/16W
R254	0187097	CF 100 OHM +-5% 1/16W
R255	0187093	CF 15K OHM +-5% 1/16W
R256	0187097	CF 100 OHM +-5% 1/16W
R257	0187093	CF 15K OHM +-5% 1/16W
R258	0114143	CF 330 OHM +-5% 1/4W
R259	0187049	CF 220 OHM +-5% 1/16W
R260	0187049	CF 220 OHM +-5% 1/16W
R261	0150039	VR RS-8 20 KOHM-B
R262	0150039	VR RS-8 20 KOHM-B
R265	0187105	CF 47K OHM +-5% 1/16W
R266	0187101	CF 33K OHM +-5% 1/16W
R268	0187101	CF 33K OHM +-5% 1/16W
R269	0100069	CF 1.5K OHM +-5% 1/8W
R270	0187081	CF 4.7K OHM +-5% 1/16W
R271	0187098	CF 24K OHM +-5% 1/16W
R272	0187098	CF 24K OHM +-5% 1/16W
R273	0100117	CF 150K OHM +-5% 1/8W
R274	0100117	CF 150K OHM +-5% 1/8W
R275	0187112	CF 91K OHM +-5% 1/16W
⚠ R276	0119508	FR 56 OHM +-5% 1/4W
R281	0187089	CF 10K OHM +-5% 1/16W
R282	0187089	CF 10K OHM +-5% 1/16W
R283	0187094	CF 16K OHM +-5% 1/16W
R284	0187094	CF 16K OHM +-5% 1/16W

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SYMBOL NO.	PART NO.	DESCRIPTION
R285	0187087	CF 8.2K OHM +-5% 1/16W
R286	0187087	CF 8.2K OHM +-5% 1/16W
R287	0187111	CF 82K OHM +-5% 1/16W
R288	0187083	CF 5.6K OHM +-5% 1/16W
R289	0187065	CF 1K OHM +-5% 1/16W
R290	0187065	CF 1K OHM +-5% 1/16W
R291	0119505	FR 2.2 OHM +-5% 1/4W
R301	0187057	CF 470 OHM +-5% 1/16W
R302	0187059	CF 560 OHM +-5% 1/16W
R303	0187095	CF 18K OHM +-5% 1/16W
R304	0187089	CF 10K OHM +-5% 1/16W
R305	0187073	CF 2.2K OHM +-5% 1/16W
R306	0187041	CF 100 OHM +-5% 1/16W
R307	0187073	CF 2.2K OHM +-5% 1/16W
R308	0187073	CF 2.2K OHM +-5% 1/16W
R309	0187067	CF 1.2K OHM +-5% 1/16W
R310	0187089	CF 10K OHM +-5% 1/16W
R311	0187081	CF 4.7K OHM +-5% 1/16W
R312	0187071	CF 1.8K OHM +-5% 1/16W
R313	0187065	CF 1K OHM +-5% 1/16W
R314	0187079	CF 3.9K OHM +-5% 1/16W
R315	0187093	CF 15K OHM +-5% 1/16W
⚠ R316	0110208	NF 30 OHM +-5% 2W
R317	0187057	CF 470 OHM +-5% 1/16W
R318	0187057	CF 470 OHM +-5% 1/16W
R319	0187081	CF 4.7K OHM +-5% 1/16W
R320	0187063	CF 820 OHM +-5% 1/16W
R321	0187063	CF 820 OHM +-5% 1/16W
R322	0187103	CF 39K OHM +-5% 1/16W
R323	0187103	CF 39K OHM +-5% 1/16W
R324	0187113	CF 100K OHM +-5% 1/16W
R325	0187057	CF 470 OHM +-5% 1/16W
R326	0150034	VR 500 OHM-B RS-8
R327	0187081	CF 4.7K OHM +-5% 1/16W
R328	0187065	CF 1K OHM +-5% 1/16W
R329	0187081	CF 4.7K OHM +-5% 1/16W
R330	0187091	CF 12K OHM +-5% 1/16W
R331	0187053	CF 330 OHM +-5% 1/16W
R332	0187053	CF 330 OHM +-5% 1/16W
R333	0187091	CF 12K OHM +-5% 1/16W
R334	0150036	VR 2K OHM-B RS-8
R335	0187083	CF 5.6K OHM +-5% 1/16W
R336	0187081	CF 4.7K OHM +-5% 1/16W
R337	0187089	CF 10K OHM +-5% 1/16W
R338	0100131	CF 560K OHM +-5% 1/8W
R339	0187089	CF 10K OHM +-5% 1/16W
R340	0187089	CF 10K OHM +-5% 1/16W
R341	0187081	CF 4.7K OHM +-5% 1/16W
R342	0187091	CF 12K OHM +-5% 1/16W
R344	0187059	CF 560 OHM +-5% 1/16W

SYMBOL NO.	PART NO.	DESCRIPTION
R345	0187101	CF 33K OHM +-5% 1/16W
R346	0187053	CF 330 OHM +-5% 1/16W
R347	0187065	CF 1K OHM +-5% 1/16W
R348	0187069	CF 1.5K OHM +-5% 1/16W
R349	0187075	CF 2.7K OHM +-5% 1/16W
R350	0187065	CF 1K OHM +-5% 1/16W
R351	0187069	CF 1.5K OHM +-5% 1/16W
R352	0119505	FR 2.2 OHM +-5% 1/4W
R401	0187073	CF 2.2K OHM +-5% 1/16W
R402	0187097	CF 100 OHM +-5% 1/16W
R403	0150040	VR 50K OHM-B RS-8
R404	0187079	CF 3.9K OHM +-5% 1/16W
R405	0150040	VR 50K OHM-B RS-8
R406	0187079	CF 3.9K OHM +-5% 1/16W
R407	0187085	CF 6.8K OHM +-5% 1/16W
R408	0187077	CF 3.3K OHM +-5% 1/16W
R409	0150038	VR 10K OHM-B RS-8
R410	0187081	CF 4.7K OHM +-5% 1/16W
R411	0187061	CF 680 OHM +-5% 1/16W
R412	0187075	CF 2.7K OHM +-5% 1/16W
R413	0187065	CF 1K OHM +-5% 1/16W
R414	0150037	VR 5K OHM-B RS-8
R415	0187069	CF 1.5K OHM +-5% 1/16W
R416	0187063	CF 820 OHM +-5% 1/16W
R417	0187063	CF 820 OHM +-5% 1/16W
R418	0187063	CF 820 OHM +-5% 1/16W
R419	0150037	VR 5K OHM-B RS-8
R420	0187073	CF 2.2K OHM +-5% 1/16W
R421	0187063	CF 820 OHM +-5% 1/16W
R422	0187063	CF 820 OHM +-5% 1/16W
R423	0187027	CF 27 OHM +-5% 1/16W
R424	0187073	CF 2.2K OHM +-5% 1/16W
R425	0187059	CF 560 OHM +-5% 1/16W
⚠ R501	0119505	FR 2.2 OHM +-5% 1/4W
R502	0187061	CF 680 OHM +-5% 1/16W
R503	0150037	VR 5K OHM-B RS-8
R504	0187089	CF 10K OHM +-5% 1/16W
R505	0187069	CF 1.5K OHM +-5% 1/16W
R506	0187093	CF 15K OHM +-5% 1/16W
R507	0187083	CF 5.6K OHM +-5% 1/16W
R508	0187065	CF 1K OHM +-5% 1/16W
R509	0187021	CF 15 OHM +-5% 1/16W
R510	0187069	CF 1.5K OHM +-5% 1/16W
R511	0187079	CF 3.9K OHM +-5% 1/16W
R512	0187077	CF 3.3K OHM +-5% 1/16W
R513	0187081	CF 4.7K OHM +-5% 1/16W
R514	0187081	CF 4.7K OHM +-5% 1/16W
R515	0187059	CF 560 OHM +-5% 1/16W
R516	0187059	CF 560 OHM +-5% 1/16W
R517	0187069	CF 1.5K OHM +-5% 1/16W

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SYMBOL NO.	PART NO.	DESCRIPTION	SYMBOL NO.	PART NO.	DESCRIPTION
R518	0187075	CF 2.7K OHM +-5% 1/16W	R616	0187083	CF 5.6K OHM +-5% 1/16W
R519	0187059	CF 560 OHM +-5% 1/16W	R617	0187081	CF 4.7K OHM +-5% 1/16W
R520	0100133	CF 680K OHM +-5% 1/8W	R618	0187075	CF 2.7K OHM +-5% 1/16W
R521	0187081	CF 4.7K OHM +-5% 1/16W	R619	0187059	CF 560 OHM +-5% 1/16W
R522	0150039	VR RS-8 20 KOHM-B	R620	0187073	CF 2.2K OHM +-5% 1/16W
R524	0187095	CF 18K OHM +-5% 1/16W	R621	0187077	CF 3.3K OHM +-5% 1/16W
R525	0187065	CF 1K OHM +-5% 1/16W	R622	0187073	CF 2.2K OHM +-5% 1/16W
R526	0187065	CF 1K OHM +-5% 1/16W	R623	0187093	CF 15K OHM +-5% 1/16W
R527	0187087	CF 8.2K OHM +-5% 1/16W	R624	0187073	CF 2.2K OHM +-5% 1/16W
R528	0187067	CF 1.2K OHM +-5% 1/16W	R625	0187089	CF 10K OHM +-5% 1/16W
R529	0187065	CF 1K OHM +-5% 1/16W	R626	0187089	CF 10K OHM +-5% 1/16W
R530	0114139	CF 220 OHM +-5% 1/4W	R634	0187077	CF 3.3K OHM +-5% 1/16W
R531	0187059	CF 560 OHM +-5% 1/16W	R636	0150037	VR 5K OHM-B RS-8
R534	0187087	CF 8.2K OHM +-5% 1/16W	R637	0187065	CF 1K OHM +-5% 1/16W
R551	0100119	CF 180K OHM +-5% 1/8W	R638	0187059	CF 560 OHM +-5% 1/16W
R552	0187097	CF 100 OHM +-5% 1/16W	R639	0187083	CF 5.6K OHM +-5% 1/16W
R553	0187091	CF 12K OHM +-5% 1/16W	R640	0187083	CF 5.6K OHM +-5% 1/16W
R554	0187111	CF 82K OHM +-5% 1/16W	R641	0187077	CF 3.3K OHM +-5% 1/16W
R555	0100125	CF 330K OHM +-5% 1/8W	R642	0187097	CF 100 OHM +-5% 1/16W
R556	0100115	CF 120K OHM +-5% 1/8W	R643	0187081	CF 4.7K OHM +-5% 1/16W
R557	0187109	CF 68K OHM +-5% 1/16W	R644	0187097	CF 100 OHM +-5% 1/16W
R558	0100125	CF 330K OHM +-5% 1/8W	R645	0150038	VR 10K OHM-B RS-8
R559	0187113	CF 100K OHM +-5% 1/16W	R646	0187101	CF 33K OHM +-5% 1/16W
R560	0187089	CF 10K OHM +-5% 1/16W	R647	0187065	CF 1K OHM +-5% 1/16W
R561	0187091	CF 12K OHM +-5% 1/16W	R648	0187113	CF 100K OHM +-5% 1/16W
R562	0187103	CF 39K OHM +-5% 1/16W	R649	0187089	CF 10K OHM +-5% 1/16W
R563	0187087	CF 8.2K OHM +-5% 1/16W	R650	0187107	CF 56K OHM +-5% 1/16W
R564	0187099	CF 27K OHM +-5% 1/16W	R651	0187089	CF 10K OHM +-5% 1/16W
R565	0187105	CF 47K OHM +-5% 1/16W	R652	0114137	CF 180 OHM +-5% 1/4W
R566	0187113	CF 100K OHM +-5% 1/16W	R653	0187093	CF 15K OHM +-5% 1/16W
R567	0187107	CF 56K OHM +-5% 1/16W	R654	0187111	CF 82K OHM +-5% 1/16W
R568	0187085	CF 6.8K OHM +-5% 1/16W	R656	0187069	CF 1.5K OHM +-5% 1/16W
R569	0187089	CF 10K OHM +-5% 1/16W	R657	0187065	CF 1K OHM +-5% 1/16W
R570	0113694	CF 5.6 OHM +-5% 1/2W	R658	0187081	CF 4.7K OHM +-5% 1/16W
R571	0113725	CF 100 OHM +-5% 1/2W	R659	0187081	CF 4.7K OHM +-5% 1/16W
R572	0187081	CF 4.7K OHM +-5% 1/16W	R660	0187081	CF 4.7K OHM +-5% 1/16W
R573	0187081	CF 4.7K OHM +-5% 1/16W	R661	0187079	CF 3.9K OHM +-5% 1/16W
R574	0119505	FR 2.2 OHM +-5% 1/4W	R662	0187079	CF 3.9K OHM +-5% 1/16W
R601	0187083	CF 5.6K OHM +-5% 1/16W	R663	0187101	CF 33K OHM +-5% 1/16W
R602	0187093	CF 15K OHM +-5% 1/16W	R664	0187101	CF 33K OHM +-5% 1/16W
R603	0187089	CF 10K OHM +-5% 1/16W	R666	0113725	CF 100 OHM +-5% 1/2W
R604	0187065	CF 1K OHM +-5% 1/16W	R667	0187089	CF 10K OHM +-5% 1/16W
R605	0187065	CF 1K OHM +-5% 1/16W	R668	0187089	CF 10K OHM +-5% 1/16W
R606	0187081	CF 4.7K OHM +-5% 1/16W	R669	0100133	CF 680K OHM +-5% 1/8W
R609	0187077	CF 3.3K OHM +-5% 1/16W	R670	0187053	CF 330 OHM +-5% 1/16W
R611	0187075	CF 2.7K OHM +-5% 1/16W	R701	0187101	CF 33K OHM +-5% 1/16W
R612	0187089	CF 10K OHM +-5% 1/16W	R702	0187089	CF 10K OHM +-5% 1/16W
R613	0187077	CF 3.3K OHM +-5% 1/16W	R703	0187081	CF 4.7K OHM +-5% 1/16W
R614	0187077	CF 3.3K OHM +-5% 1/16W	R704	0187073	CF 2.2K OHM +-5% 1/16W
R615	0187085	CF 6.8K OHM +-5% 1/16W	R705	0187073	CF 2.2K OHM +-5% 1/16W

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SYMBOL NO.	PART NO.	DESCRIPTION
R706	0187041	CF 100 OHM +-5% 1/16W
R707	0187089	CF 10K OHM +-5% 1/16W
R708	0187095	CF 18K OHM +-5% 1/16W
R709	0187095	CF 18K OHM +-5% 1/16W
R710	0187087	CF 8.2K OHM +-5% 1/16W
R711	0187113	CF 100K OHM +-5% 1/16W
R712	0113725	CF 100 OHM +-5% 1/2W
R713	0187101	CF 33K OHM +-5% 1/16W
R714	0187101	CF 33K OHM +-5% 1/16W
R715	0187101	CF 33K OHM +-5% 1/16W
R716	0187101	CF 33K OHM +-5% 1/16W
R717	0187089	CF 10K OHM +-5% 1/16W
R718	0187089	CF 10K OHM +-5% 1/16W
R719	0187105	CF 47K OHM +-5% 1/16W
R720	0187105	CF 47K OHM +-5% 1/16W
R729	0187065	CF 1K OHM +-5% 1/16W
R730	0187085	CF 6.8K OHM +-5% 1/16W
● R731	0187093	CF 15K OHM +-5% 1/16W
● R732	0187087	CF 8.2K OHM +-5% 1/16W
R733	0187109	CF 68K OHM +-5% 1/16W
R738	0187077	CF 3.3K OHM +-5% 1/16W
R739	0187077	CF 3.3K OHM +-5% 1/16W
R740	0187091	CF 12K OHM +-5% 1/16W
R741	0187077	CF 3.3K OHM +-5% 1/16W
R743	0187077	CF 3.3K OHM +-5% 1/16W
R749	0187099	CF 27K OHM +-5% 1/16W
R750	0187065	CF 1K OHM +-5% 1/16W
R751	0100009	CF 4.7 OHM +-5% 1/8W
R752	0100041	CF 100 OHM +-5% 1/8W
R754	0187065	CF 1K OHM +-5% 1/16W
R756	0187073	CF 2.2K OHM +-5% 1/16W
R757	0187089	CF 10K OHM +-5% 1/16W
R758	0187045	CF 150 OHM +-5% 1/16W
R759	0187067	CF 1.2K OHM +-5% 1/16W
R760	0119514	FR 10 OHM +-5% 1/4W
R762	0187105	CF 47K OHM +-5% 1/16W
R763	0187105	CF 47K OHM +-5% 1/16W
R764	0187105	CF 47K OHM +-5% 1/16W
R765	0100041	CF 100 OHM +-5% 1/8W
R766	0187089	CF 10K OHM +-5% 1/16W
R767	0187089	CF 10K OHM +-5% 1/16W
R768	0187089	CF 10K OHM +-5% 1/16W
R769	0187089	CF 10K OHM +-5% 1/16W
R770	0187089	CF 10K OHM +-5% 1/16W
R771	0100059	CF 560 OHM +-5% 1/8W
R772	0187105	CF 47K OHM +-5% 1/16W
R773	0187089	CF 10K OHM +-5% 1/16W
R774	0187059	CF 560 OHM +-5% 1/16W
R775	0187089	CF 10K OHM +-5% 1/16W
R776	0119505	FR 2.2 OHM +-5% 1/4W
R777	0187097	CF 100 OHM +-5% 1/16W
R778	0187057	CF 470 OHM +-5% 1/16W
R779	0187047	CF 180 OHM +-5% 1/16W
R780	0187041	CF 100 OHM +-5% 1/16W
R781	0187041	CF 100 OHM +-5% 1/16W
R782	0187049	CF 220 OHM +-5% 1/16W
R783	0187041	CF 100 OHM +-5% 1/16W
R784	0187065	CF 1K OHM +-5% 1/16W
R785	0187047	CF 180 OHM +-5% 1/16W
R786	0187065	CF 1K OHM +-5% 1/16W
R787	0187041	CF 100 OHM +-5% 1/16W
R788	0187065	CF 1K OHM +-5% 1/16W
● R789	0187065	CF 1K OHM +-5% 1/16W
R801	0187071	CF 1.8K OHM +-5% 1/16W
R802	0187077	CF 3.3K OHM +-5% 1/16W
R803	0187093	CF 15K OHM +-5% 1/16W
R804	0187101	CF 33K OHM +-5% 1/16W
R805	0187105	CF 47K OHM +-5% 1/16W
R806	0187107	CF 56K OHM +-5% 1/16W
⚠ R807	0119505	FR 2.2 OHM +-5% 1/4W
R808	0187109	CF 68K OHM +-5% 1/16W
R809	0187081	CF 4.7K OHM +-5% 1/16W
R811	0187083	CF 5.6K OHM +-5% 1/16W
R812	0187109	CF 68K OHM +-5% 1/16W
R813	0187065	CF 1K OHM +-5% 1/16W
R814	0187065	CF 1K OHM +-5% 1/16W
R815	0187065	CF 1K OHM +-5% 1/16W
R816	0187041	CF 100 OHM +-5% 1/16W
⚠ R902	0110317	MF 68 OHM +-5% 3W
R903	0114161	CF 1K OHM +-5% 1/4W
R904	0100065	CF 1K OHM +-5% 1/8W
⚠ R905	0119514	FR 10 OHM +-5% 1/4W
R906	0187075	CF 2.7K OHM +-5% 1/16W
R907	0150036	VR 2K OHM-B RS-8
R908	0187093	CF 15K OHM +-5% 1/16W
R909	0187063	CF 820 OHM +-5% 1/16W
R910	0187101	CF 33K OHM +-5% 1/16W
R911	0100065	CF 1K OHM +-5% 1/8W
R912	0187061	CF 680 OHM +-5% 1/16W
⚠ R914	0113725	CF 100 OHM +-5% 1/2W
R915	0110208	MF 30 OHM +-5% 2W
R916	0187063	CF 820 OHM +-5% 1/16W
R917	0187061	CF 680 OHM +-5% 1/16W

ICs

IC001	2366261	IC BA852
IC002	2364861	IC HA13006
IC003	2362611	IC HD14001B
IC201	2367342	IC TA7691P

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SYMBOL NO.	PART NO.	DESCRIPTION
IC202	2367342	IC TA7691P
IC203	2362603	IC HA17458/UPC4558/RC4558
IC204	2366301	IC UPD4052BC
IC205	2368761	IC HA12044
IC206	2362603	IC HA17458/UPC4558/RC4558
IC301	2365021	IC UPC1391H
IC302	2367341	IC TA7685P
IC401	2364992	IC TL850CP
IC501	2367551	IC TA7683P
IC551	2362603	IC HA17458/UPC4558/RC4558
IC552	2362603	IC HA17458/UPC4558/RC4558
IC601	2365031	IC UPC1037H
IC602	2365031	IC UPC1037H
IC603	2363191	IC HD14066BP
IC604	2362611	IC HD14001B
IC701	2368992	IC HD6805W
IC702	2369351	IC SC42682P
IC703	2369011	IC BA6208
IC704	2369021	IC BA6109
IC801	2362601	IC HA17458PS
TRANSISTORS		
● Q1001	0573480	TR 2SC458B
Q1051	2323342	TR 2SC2021(R)
Q201	2323342	TR 2SC2021(R)
Q202	2323342	TR 2SC2021(R)
Q203	2323342	TR 2SC2021(R)
Q204	2323342	TR 2SC2021(R)
Q205	2323342	TR 2SC2021(R)
Q206	2323342	TR 2SC2021(R)
Q207	2323342	TR 2SC2021(R)
Q208	2323342	TR 2SC2021(R)
Q209	2323342	TR 2SC2021(R)
Q301	2323342	TR 2SC2021(R)
Q302	2323342	TR 2SC2021(R)
Q303	2323342	TR 2SC2021(R)
Q304	2323342	TR 2SC2021(R)
Q305	2323342	TR 2SC2021(R)
Q306	2323342	TR 2SC2021(R)
Q307	2323342	TR 2SC2021(R)
Q308	2323353	TR 2SB642R/S,2SA937R
Q309	2323342	TR 2SC2021(R)
Q310	2323342	TR 2SC2021(R)
Q311	2323342	TR 2SC2021(R)
Q312	2323342	TR 2SC2021(R)
Q401	2323342	TR 2SC2021(R)
Q402	2323342	TR 2SC2021(R)
Q403	2323342	TR 2SC2021(R)
Q404	2323342	TR 2SC2021(R)
Q405	2323342	TR 2SC2021(R)
Q406	2323342	TR 2SC2021(R)
Q501	2323342	TR 2SC2021(R)
Q502	2323342	TR 2SC2021(R)
Q503	2323342	TR 2SC2021(R)
Q551	2323841	TR 2SD467(C)
Q552	2323831	TR 2SB561(C)
Q553	2323841	TR 2SD467(C)
Q554	2323831	TR 2SB561(C)
Q555	2323353	TR 2SB642R/S,2SA937R
Q556	2323353	TR 2SB642R/S,2SA937R
Q601	2323342	TR 2SC2021(R)
Q602	2323342	TR 2SC2021(R)
Q605	2323342	TR 2SC2021(R)
Q606	2323342	TR 2SC2021(R)
Q607	2323342	TR 2SC2021(R)
Q608	2323342	TR 2SC2021(R)
Q609	2323342	TR 2SC2021(R)
Q613	2323342	TR 2SC2021(R)
Q614	2323342	TR 2SC2021(R)
Q615	2323342	TR 2SC2021(R)
Q616	2323342	TR 2SC2021(R)
Q617	2323342	TR 2SC2021(R)
Q618	2323353	TR 2SB642R/S,2SA937R
Q619	2323353	TR 2SB642R/S,2SA937R
Q620	2323353	TR 2SB642R/S,2SA937R
Q621	2323342	TR 2SC2021(R)
Q622	2323342	TR 2SC2021(R)
Q701	2323342	TR 2SC2021(R)
Q702	2323353	TR 2SB642R/S,2SA937R
Q705	2323342	TR 2SC2021(R)
Q706	2323342	TR 2SC2021(R)
Q707	2323342	TR 2SC2021(R)
Q708	2321893	TR 2SB562(C)
Q709	2323353	TR 2SB642R/S,2SA937R
Q710	2323342	TR 2SC2021(R)
Q711	2323342	TR 2SC2021(R)
Q712	2323342	TR 2SC2021(R)
Q713	2323342	TR 2SC2021(R)
Q714	2323353	TR 2SB642R/S,2SA937R
Q715	2323342	TR 2SC2021(R)
Q801	2321803	TR 2SK40(C/D)
Q802	2323342	TR 2SC2021(R)
Q803	2323353	TR 2SB642R/S,2SA937R
Q804	2321882	TR 2SD466(C)
Q805	2321893	TR 2SB562(C)
Q901	2323431	TR 2SC1963
Q902	2323353	TR 2SB642R/S,2SA937R
Q903	2323342	TR 2SC2021(R)

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SYMBOL NO.	PART NO.	DESCRIPTION
Q904	2320846	TR 2SC1162WT B/C
Q905	2321882	TR 2SD468(C)
		DIODES
D001	2331351	DI 1S2076/1S2473H
D002	2331351	DI 1S2076/1S2473H
● D1001	2332431	DI PH302
D201	2331351	DI 1S2076/1S2473H
D202	2331351	DI 1S2076/1S2473H
D203	2331564	ZD RD11EB
D204	2331564	ZD RD11EB
D205	2334061	ZD RD3.0E
D207	2331351	DI 1S2076/1S2473H
D301	2331351	DI 1S2076/1S2473H
D302	2331351	DI 1S2076/1S2473H
D303	2331351	DI 1S2076/1S2473H
D304	2331351	DI 1S2076/1S2473H
D401	2331564	ZD RD11EB
D501	2331564	ZD RD11EB
D551	2334061	ZD RD3.0E
D552	2334061	ZD RD3.0E
D601	2331351	DI 1S2076/1S2473H
D602	2331351	DI 1S2076/1S2473H
D603	2331351	DI 1S2076/1S2473H
D604	2331351	DI 1S2076/1S2473H
D605	2331351	DI 1S2076/1S2473H
D606	2331351	DI 1S2076/1S2473H
D607	2334061	ZD RD3.0E
D701	2332031	LED SLR53URT
D702	2331351	DI 1S2076/1S2473H
D703	2331351	DI 1S2076/1S2473H
D704	2331351	DI 1S2076/1S2473H
D705	2331351	DI 1S2076/1S2473H
D706	2333641	DI PS4005 PHOTO INTERRUPTER
D707	2332031	LED SLR53URT
D708	2332031	LED SLR53URT
D709	2331351	DI 1S2076/1S2473H
D711	2331822	DI HZ9A
D712	2331351	DI 1S2076/1S2473H
D713	2334061	ZD RD3.0E
D714	2331351	DI 1S2076/1S2473H
D715	2331351	DI 1S2076/1S2473H
D716	2331351	DI 1S2076/1S2473H
D718	2331822	DI HZ9A
D719	2331822	DI HZ9A
D720	2331822	DI HZ9A
D721	2331351	DI 1S2076/1S2473H
D723	2331822	DI HZ9A
D724	2331822	DI HZ9A

SYMBOL NO.	PART NO.	DESCRIPTION
⚠ D901	2333931	DI 1D2C1
⚠ D902	2333941	DI 1D2Z1
⚠ D903	2332461	DI SM-1A-02
⚠ D904	2332461	DI SM-1A-02
D905	2334243	ZD RD16EB2
D906	2334061	ZD RD3.0E
D907	2331805	ZD HZ6(B)2
		COILS
● L1001	2120486	FILTER COIL 4700MI
L303	2122956	LAL AXIAL COIL
L304	2122943	LAL AXIAL COIL
L305	2122943	LAL AXIAL COIL
L306	2122951	LAL AXIAL COIL
L307	2122949	LAL AXIAL COIL
L308	2120482	FILTER COIL 100MH 10%
L309	2122952	LAL AXIAL COIL
L310	2122947	LAL AXIAL COIL
L311	2122952	LAL AXIAL COIL
L401	2122956	LAL AXIAL COIL
L402	2122956	LAL AXIAL COIL
L403	2122956	LAL AXIAL COIL
L404	2122954	LAL AXIAL COIL
L406	2122959	LAL AXIAL COIL
L407	2122957	LAL AXIAL COIL
L408	2122951	LAL AXIAL COIL
L410	2122954	LAL AXIAL COIL
L411	2122954	LAL AXIAL COIL
L501	2142682	7PL COIL 50MH
L502	2142681	7PL COIL 15MH
L503	2122945	LAL AXIAL COIL
L504	2122951	LAL AXIAL COIL
L505	2122941	LA AXIAL COIL
L506	2122951	LAL AXIAL COIL
L507	2122945	LAL AXIAL COIL
L508	2122942	LAL AXIAL COIL
L509	2122948	LAL AXIAL COIL
L601	2142681	7PL COIL 15MH
L602	2122947	LAL AXIAL COIL
L603	2122942	LAL AXIAL COIL
L604	2122947	LAL AXIAL COIL
L605	2122942	LAL AXIAL COIL
L9051	2122691	LINE FILTER
		TRANSFORMERS
⚠ T901	2213351	POWER TRANSFORMER

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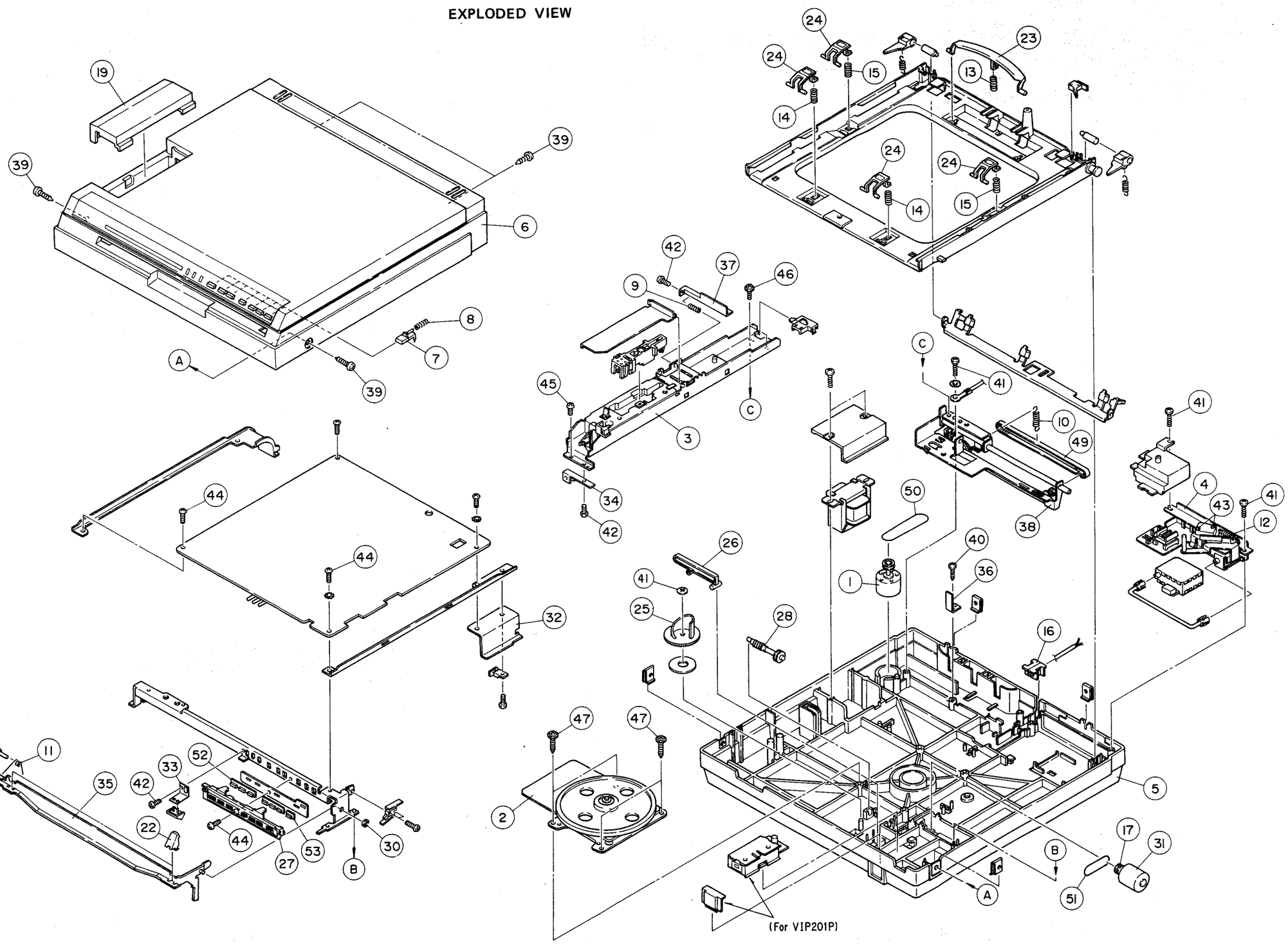
SYMBOL NO.	PART NO.	DESCRIPTION
		COMPOUND COMPONENTS
CP201	2163001	BAND PASS FILTER 716KHZ
CP202	2163002	BAND PASS FILTER 906 KHZ
CP301	2163001	BAND PASS FILTER 716KHZ
● CP602	2784693	TRIMMER CAPACITOR 30PF
		FUSES
⚠ F901	2720256	FUSE 160MA
		MISCELLANEOUS
HE001	2390061	HALE ELEMENT H-300A
HE002	2390061	HALE ELEMENT H-300A
HE003	2390061	HALE ELEMENT H-300A
SW701	2620641	SLIDE SWITCH
SW702	2620642	SLIDE SWITCH
S1051	2620581	SLIDE SWITCH
⚠ S901	2631771	POWER SWITCH
X501	2784801	CRYSTAL
X502	2791001	CRYSTAL 5.95MHZ
X701	2790441	CRYSTAL
	2365531	IC HD44042
	2520351	ARM MOTOR
	2520372	DD MOTOR ASS'Y
	2520461	DC MOTOR MCA2813
	2540331	PIC UP ASS'Y
	2550183	CARTRIDGE ASS'Y
	2582871	RF MODULATOR ASS'Y
●	2582961	REMOCON TRANSMITTOR
	2671411	JACK FOR REMOCON
	2583011	RF MODULATOR
	2661941	L TYPE PLUG WITH BASE2P
	2662371	PLUG
	2663921	CD CABLE
	2720221	FUSE HOLDER
	2772741	FERRITE RING
	2782611	CENTER PIN
	2783181	LEAD PIN
	2786531	F CONNECTOR LEAD
●	2790321	CERAMIC FILTER CSB-455A/C
	2981091	ANTENNA TERMINAL BOARD
●	3010051	UPPER COVER
	3010052	UPPER COVER SASS
	3227973	LOWER COVER
	3332377	SPRING
	3332591	R2 SHUTTER SPRING
	3332602	TENSION SPRING
	3332632	CADDY DOOR SPRING
	3333171	RF CHANGE SPRING
	3333181	LIFTER SPRING B
	3333191	LIFTER SPRING F
	3333201	LIFTER SPRING M
	3721832	FASTENER
	3739671	BS CORD HOLDER
	3764484	PULLEY 11
	3764682	TIMING PULLEY
	3771882	NAIL LEVER RV
	3771892	NAIL LEVER LV
	3771941	CADDY GUIDE H
	3779981	LIFTER B
	3779991	LIFTER F
	3780041	LOADING GEAR
	3780051	LOADING ROD
	3780181	RUBBER SWITCH HOLDER
	3780721	WORM L
	3780851	CADDY RAIL ASS'Y
	4139323	E RING 3MM
	4252421	HEAT SINK
	4260243	SPINE HOLDER
	4260322	ARM STAY F
	4260421	CADDY DOOR
	4262871	SPRING-CADDY RETURN
	4276741	SHUTTER
	4278021	ARM DRIVE ASS'Y
	4514078	4X14 SPECIAL SCREW (BLACK)
	4518261	4X12 TAPPING SCREW
	4518262	4X16 TAPPING SCREW
	4518271	M3X8 DT SCREW
	4518274	M3X16 DT SCREW
	4518276	SCREW 3X6MM BLACK
	4518277	M3X6 SCREW
	4519781	3X6 CUP SCREW
	4519801	4X14 CUP SCREW
	4519951	POWER SW ROD SCREW
	4520071	3X4 DT SCREW
	4520303	SHIPPING SCREW
	4615561	TIMING BELT 190MM
	4615692	DRIVE BELT 29.4MM
	4615694	DRIVING BELT
	4616871	RUBBER SWITCH (A)
	4616881	RUBBER SWITCH (B)

● . . . . . For VIP201P Only

EXPLODED VIEW



HITACHI
SERVICE MANUAL

YK | **No.911E-1**
No.937E-1

VIP201P/VIP202P
VIP101P

SUPPLEMENT

This SUPPLEMENT issued exploded view with miscellaneous parts list for VIP101P, VIP201P and VIP202P.
Please use this supplement with original service manual.

MISCELLANEOUS PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
6	3010052	Upper cover (VIP201P/VIP202P)	28	3780721	Worm L
6	3010053	Upper cover (VIP101P)	30	4139323	E-ring 3mm
35	4260421	Caddy door	32	4252421	Heat sink
19	3764693	Door-cartridge	1	2520351	Arm motor assy
2	2520372	DD motor assy	31	2520461	DC motor
3	2540331	Pickup assy	33	4260243	Spine holder
4	2582871	RF modulator assy (VIP201P/VIP202P)	34	4260322	Arm stay F
4	2582872	RF modulator assy (VIP101P)	36	4262871	Spring-caddy return
5	3227973	Lower cover (VIP201P/VIP202P)	41	4263501	CS ring
5	3227974	Lower cover (VIP101P)	37	4276741	Shutter
9	3332591	R2 shutter spring	39	4514078	4x14 Special screw (Black)
10	3332602	Tension spring	40	4518261	4x12 Tapping screw
11	3332632	Caddy door spring	41	4518262	4x16 Tapping screw
12	3333171	RF change spring	42	4518271	M3x8 DT screw
14	3333191	Lifter spring F	41	4518274	M3x16 DT screw
13	3333181	Lifter spring B	44	4518276	Screw 3x8 black
15	3333201	Lifter spring M	45	4518277	M3x6 Screw
16	3739671	BS cord holder	47	4519801	4x14 Cup screw
17	3764484	Pulley 11	43	4519951	Power SW rod screw
38	3764682	Timing-pulley	51	4615694	Driving belt
22	3771941	Caddy guide H	49	4615561	Timing belt 190mm
23	3779981	Lifter B	50	4615692	Drive belt 29.4mm
24	3779991	Lifter F	52	4616871	Rubber switch (A)
25	3780041	Loading gear	53	4616881	Rubber switch (B)
26	3780051	Loading rod	8	3332231	Knob spring
27	3780181	Rubber-switch holder	7	3264144	Knob

HITACHI

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VIDEO DISC PLAYER

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CED SYSTEM